

3/1/05 - 02703

Final

**Time Critical Removal Action/Interim Measures Work Plan
Surface Munitions and Explosives of Concern at Munitions
Response Area-Live Impact Area, Munitions Response
Sites 1-8, 13, 15-20, and 29-31**

Former Vieques Training Range (VNTR)

Vieques, Puerto Rico



Prepared for
**Department of the Navy
Naval Facilities Engineering Command
Atlantic**

Contract No. N62470-02-D-3052
CTO-0047

Prepared by
CH2MHILL

March 2005

Final

**Time Critical Removal Action/Interim Measures Work Plan
Surface Munitions and Explosives of Concern at Munitions
Response Area-Live Impact Area, Munitions Response Sites
1 through 8, 13, 15 through 20, and 29 through 31**

**Former Vieques Naval Training Range (VNTR)
Vieques, Puerto Rico**

**Prepared for
Department of the Navy
Atlantic Division
Naval Facilities Engineering Command**

**Contract Task Order - 0047
Contract No. N62470-02-D-3052**

Prepared by



March 2005

Executive Summary

Munitions Response Program Overview

The Munitions Response Program (MRP) for the former Vieques Naval Training Range (VNTR), Vieques Island, Puerto Rico, is anticipated to be a phased approach that will extend over several years. The objectives of the MRP include the following:

- Munitions response actions will integrate multiple regulatory programs including the RCRA Consent Order, the CERCLA NPL listing and the MOA between the Navy and DOI.
- Conduct munitions response investigations concurrently with munitions removal programs to initiate cleanup during the initial phases of the program.
- Prioritize munitions response actions at sites, using DOD protocol, based on risk to human health and the environment and expected land use while considering the limited source of funding that is available.
- Conduct a phased approach for response actions which include: site inspections, site investigations, interim removal action, time-critical removal actions, and permanent remedial actions.
- Assess NPL designated "Agreed Areas" using CERCLA process for delineating the extent of the sites.
- Munitions Response Areas (MRAs) will be sectioned into parcels and Munitions Response Sites (MRSs) to provide an orderly, structured approach for the munitions response actions.
- Develop response actions that are consistent with the DOI Comprehensive Conservation Plan.

Time Critical Removal Action/Interim Measures Work Plan - Surface Munitions and Explosives of Concern at MRA-Live Impact Area, MRSs 1 through 8, 13, 15 through 20, and 29 through 31

The Time Critical Removal Action (TCRA) is being conducted as part of the phased CERCLA approach for munitions response actions at the Former VNTR, which include site inspections, site investigations, interim removal actions, time-critical removal actions, and permanent remedial actions. The TCRA is part of the CERCLA process and represents a response action to address areas that pose an imminent threat to human health and the environment. The Work Plan has been developed to provide the technical approach necessary to complete a removal of surface munitions for approximately 400 acres and mitigate the hazard posed to authorized and unauthorized land users. To complete the 400 acre TCRA and meet the time and budget constraints for this action, NAVFAC will use

multiple removal action contractors. Additionally, a Title II services contractor will assist NAVFAC with site management and quality assurance.

Primary management, administration, and oversight for the Vieques Munitions Response Program is being performed by NAVFAC Atlantic Environmental Division, Caribbean Section. The NAVFAC Atlantic Remedial Project Manager is Mr. Christopher Penny and on-site MEC support is provided by Mr. Carlton Finley, Naval Activity Puerto Rico (NAPR). Mr. Finley is the primary on-site point of contact for MEC issues including quality assurance (QA). NAVFAC Atlantic will use Title II Services support for overall site management, data management, and QA support. This includes the following specific tasks: 1) providing field oversight/quality assurance services of the munitions response contractor, 2) providing data management services for the collection and management of MEC data in the Navy MRP GIS system, and 3) prepare reports summarizing the findings of the TCRA. The Title II Services will be provided by CH2M HILL. All removal action operations will be performed by the removal action contractors. The removal action contractors will be contracted directly by NAVFAC Atlantic and the contractors will subcontract all support personnel required to carry out the removal action.

The following actions will be performed as part of the time critical removal action:

- Site preparation, including vegetation removal from the areas to be cleared of munitions items and performance of UXO safety support required for this operation,
- Locating surface munitions items using a visual detector-aided approach, and
- Identification, removal, and disposal of surface munitions equal to and greater in size to a 20mm projectile.

Contents

Acronyms and Abbreviations.....	vii
Introduction	1-1
1.1 Introduction	1-1
1.2 Site History	1-2
1.3 Site Location.....	1-3
1.3.1 Former Vieques Naval Training Range (VNTR).....	1-3
1.3.2 Munitions Response Area – Live Impact Area	1-3
1.3.3 Area for Performance of Time Critical Removal Action.....	1-3
1.4 Topography, Climate and Weather, Vegetation, Geology, and Hydrology	1-3
1.4.1 Topography	1-3
1.4.2 Climate and Weather	1-5
1.4.3 Vegetation	1-5
1.4.4 Geology.....	1-6
1.4.5 Hydrology	1-6
1.4.6 Surface Water.....	1-7
1.4.7 Groundwater.....	1-7
Technical Management Plan.....	2-1
2.1 General.....	2-1
2.2 Guidance, Regulations, and Policy	2-1
2.3 Project Organization and Personnel.....	2-5
2.3.1 Composition and Management of Investigation/Removal Teams.....	2-8
2.4 Technical Scope.....	2-8
2.4.1 Mobilization.....	2-8
2.4.2 Field Office	2-9
2.4.3 Project Site Layout.....	2-9
2.4.4 Site Preparation	2-9
2.5 MEC Procedures.....	2-11
2.5.1 MEC Safety.....	2-12
2.5.2 MEC Identification.....	2-12
2.5.3 MEC Transportation	2-12
2.5.4 MEC Safe Holding Areas	2-13
2.5.5 Procedures When MEC Cannot be Destroyed Onsite or Cannot be Identified	2-13
2.5.6 Recovered Chemical Warfare Materiel	2-14
2.5.7 MEC Operations in Populated/Sensitive Areas.....	2-15
2.5.8 Demolition Procedures.....	2-15
2.5.9 Post-Demolition Operations	2-16
2.6 Engineering Controls.....	2-16
2.7 Management of Material Potentially Presenting an Explosive Hazard (MPPEH).....	2-17
2.8 Field Documentation	2-17

2.9	Data Management.....	2-17
2.9.1	Data Collection and Processing	2-17
2.9.2	Database Management and Integration with GIS.....	2-17
2.9.3	Military Munitions related Items Identification.....	2-18
2.9.4	MEC Data Records.....	2-18
2.9.5	Record Keeping/ Accountability	2-18
2.10	Site Safety and Communications.....	2-18
	Explosives Management Plan	3-1
3.1	General	3-1
3.2	Licenses and Permits	3-1
3.3	Procedures	3-1
3.3.1	Acquisition.....	3-1
3.3.2	Initial Receipt.....	3-2
3.3.3	Quantity Distance	3-2
3.3.4	Transportation.....	3-4
3.3.5	Receipt Procedures	3-5
3.3.6	Inventory	3-6
3.3.7	Lost, Stolen, or Unauthorized Use of Explosives	3-6
3.3.8	Return of Unused Explosives.....	3-6
3.3.9	Disposal of Explosives	3-6
	Explosives Siting Plan	4-1
	Geophysical Investigation Plan.....	5-1
	Site Safety and Health Plan	6-1
	Location Surveys and Mapping Plan.....	7-1
7.1	Surveying	7-1
7.2	Mapping.....	7-1
7.2.1	Digital Data.....	7-1
7.2.2	Digital Format	7-2
7.3	Deliverables	7-2
	Work, Data, and Cost Management Plan	8-1
8.1	Introduction.....	8-1
8.2	Project Tasks	8-1
8.3	Schedule	8-1
8.4	Communications.....	8-2
8.5	Records Management.....	8-2
8.6	Format and Content of Investigation Reports	8-3
	Sampling and Analysis Plan	9-1
	Quality Control Plan.....	10-1
10.1	Introduction.....	10-1
10.1.1	Project Background.....	10-1
10.1.2	Project Scope of Work	10-1
10.2	QC Personnel Organization and Responsibilities	10-1
10.2.1	QC Personnel Qualifications and Training	10-2
10.2.2	Documentation of Qualification and Training	10-3

10.2.3	Project Manager.....	10-3
10.2.4	Site Manager	10-4
10.2.5	UXO Quality Control Specialist	10-4
10.2.6	Program QC Manager	10-5
10.3	Definable Features of Work (DFOWs) and the Three-Phase Control Process...	10-6
10.3.1	Definable Features of Work	10-6
10.3.2	Mobilization	10-6
10.3.3	Location Surveying and Mapping	10-6
10.3.4	Vegetation Removal.....	10-7
10.3.5	MEC Surface Removal.....	10-7
10.3.6	MEC Disposal	10-7
10.3.7	Scrap Disposal	10-7
10.3.8	Site Restoration.....	10-7
10.3.9	Demobilization	10-7
10.3.10	Three Phases of Control	10-7
10.4	Inspection/ Audit Procedures.....	10-10
10.5	QC Testing.....	10-10
10.5.1	Testing Procedures.....	10-10
10.5.2	Documentation of Testing.....	10-18
10.6	Calibration and Maintenance	10-18
10.7	Government QA Activities	10-18
10.7.1	MEC Surface Removal or Investigations	10-18
10.8	QA Pass/Fail Criteria	10-18
10.9	Deficiency Management.....	10-19
10.9.1	Continual Improvement.....	10-19
10.9.2	Deficiency Identification and Resolution.....	10-19
10.9.3	Corrective Action Request	10-19
10.9.4	Deficiency and Corrective Action Tracking	10-20
10.9.5	Documentation	10-20
10.10	Reports	10-20
10.11	Submittal Management	10-21
10.11.1	Project Records	10-21
10.11.2	Transmittal to the Title II Services Contractor	10-22
10.11.3	Documentation	10-22
	Environmental Protection Plan	11-1
11.1	Endangered/Threatened Species within the Project Site	11-1
11.2	Wetlands within the Project Site	11-3
11.3	Cultural and Archaeological Resources within the Project Site	11-3
11.4	Water Resources within the Project Site.....	11-3
11.5	Coastal Zones within the Project Site	11-4
11.6	Trees and Shrubs to be Removed within the Project Site	11-4
11.7	Compliance with ARARS.....	11-4
11.8	Detail Procedures and Methods to Protect and/or Mitigate the Resources/Sites Identified	11-4
	Investigation Derived Waste Plan.....	12-1
12.1	Objective	12-1

12.2	Types of Potential IDW and Planned Disposition	12-1
12.3	Non-Hazardous Debris Disposal.....	12-1
12.4	Disposition of Material Potentially Presenting an Explosive Hazard (MPPEH)/Munitions Debris (MD)	12-2
12.5	Clearing and Grubbing.....	12-2
12.6	Contaminated Soil and Hazardous Waste	12-2
12.7	Transportation.....	12-2
	Geographical Information System Plan.....	13-1
13.1	Geographical Information System Incorporation	13-1
13.2	Computer Files	13-4
	References	14-1
	Appendix A Site Specific Health and Safety Plan.....	14-1
	ppendixes	

A Site Specific Health and Safety Plan

Tables

1-1	MRA-LIA MRSs Included in TCRA	1-4
1-2	Munitions Items Reported to Have Been Fired at the Former VNTR	1-4
2-1	Potentially Applicable or Relevant and Appropriate Requirements (ARARs) and Guidance To Be Considered	2-1
8-1	Projected TCRA Schedule	8-2
10-1	Definable Features of Work Auditing Procedures	10-13
11-1	Rare and Endangered Terrestrial Plant Species at VNTR	11-1
11-2	Rare and Endangered Terrestrial and Amphibious Wildlife at VNTR	11-2
11-3	ARARs for Environmental Protection.....	11-4

Figures

1-1	Regional Location Map
1-2	MRA, Parcel, and MRS Boundaries
1-3	TCRA Areas
1-4	Map of Range Related Site Features
1-5	Topographic Map
2-1	TCRA Management, Contractor, and Subcontractor Organizational Chart
2-2	Logic Diagram for the Collection and Disposition of MPPEH/MD Scrap

Acronyms and Abbreviations

AFWTF	Atlantic Fleet Weapons Training Facility
AMCOM	Army Aviation and Missile Command
amsl	Above Mean Sea Level
ATG	Air-to-Ground
BD	Base Detonating
BIP	Blow-in-Place
BRAC	Base Realignment and Closure
CAP	Corrective Action Plan
CCLI	Commerce Control List Items
CDC	Controlled Detonation Chamber
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CLEAN	Comprehensive Long -Term Environmental Action Navy
CQC	Contractor Quality Control
CTO	Contract Task Order
CWM	Chemical Warfare Materiel
DDESB	Department of Defense Explosives Safety Board
DERP	Defense Environmental Restoration Program
DGM	Digital Geophysical Mapping
DMM	Discarded Military Munitions
DoD	Department of Defense
DOI	Department of Interior
DQO	Data Quality Objective
EBS	Environment Baseline Survey
ECA	Eastern Conservation Area
EHE	Explosive Hazard Evaluation
EIS	Environmental Impact Statement
EMA	Eastern Maneuver Area
EMM	Earth Moving Machinery
EOD	Explosive Ordnance Disposal
ERA	Expanded Range Assessment
ESS	Explosives Safety Submission
EZ	Exclusion Zone
°F	Degrees Fahrenheit
FAA	Federal Aviation Administration
FMFLANT	Fleet Marine Force, Atlantic
ft	feet/foot
FUDS	Formerly Used Defense Sites

GIS	Geographical Information System
GPO	Geophysical Prove-Out
GPS	Global Positioning System
HD	Hazard Division
HE	High Explosives
HTRW	Hazardous, Toxic, and Radioactive Waste
LIA	Live Impact Area
MC	Munitions Constituents
MD	Munitions Debris
MEC	Munitions and Explosives of Concern
MLI	Munitions List Items
mm	Millimeter
MPPEH	Material Potentially Presenting an Explosive Hazard
MR	Munitions Response
MRA	Munitions Response Area
MRP	Munitions Response Program
MRS	Munitions Response Site
mV	Millivolts
NAD	North American Datum
NATO	North Atlantic Treaty Organization
NAVFAC	Naval Facilities Engineering Command
NEW	Net Explosive Weight
NGFS	Naval Gunfire Support
NOSSA	Naval Ordnance Safety and Security Activity
NOTAM	Notice to Airmen
OB/OD	Open Burn/Open Detonation
OE	Ordnance Explosives
OP	Observation Point
ORS	Ordnance-Related Scrap
OSHA	Occupational Safety and Health Administration
PLS	Professional Land Surveyor
PM	Project Manager
PRASA	Puerto Rico Aqueduct and Sewer Authority
PZ	Piezoelectric
QA	Quality Assurance
QC	Quality Control
QCP	Quality Control Plan
QRP	Qualified Recycling Program
RCRA	Resource Conservation and Recovery Act
RCWM	Recovered Chemical Warfare Materiel
RFA	RCRA Facility Assessment
RTK	Real Time Kinematic

SAM	Surface to Air Missile
SDS	Spatial Data Standards
SIA	Surface Impact Area
SOP	Standard Operating Procedure
SOW	Scope of Work
SSHP	Site Specific Health Plan
SUXOS	Senior UXO Supervisor
TCRA	Time Critical Removal Action
TSDS	Tri-Spatial Data Standards
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UXO	Unexploded Ordnance
UXOQCS	UXO Quality Control Specialist
UXOSO	UXO Safety Officer
VNTR	Vieques Naval Training Range
WP	White Phosphorous

Introduction

1.1 Introduction

This Time Critical Removal Action/Interim Measures (TCRA/IM) Work Plan for the removal of surface Munitions and Explosives of Concern (MEC) from Munitions Response Area-Live Impact Area (MRA-LIA) Munitions Response Sites (MRSs) 1 through 8, 13, 15 through 20, and 29 through 31 at the former Vieques Naval Training Range (VNTR), Vieques Island, Puerto Rico (Figure 1-1), has been prepared as part of the ongoing Munitions Response Program in order to reduce risks to human health and the environment where trespassing frequently occurs. CH2M HILL prepared this work plan for the Naval Facilities Engineering Command (NAVFAC) Atlantic to meet current Department of Defense (DoD) guidelines for the investigation and clean-up of MEC.

The TCRA will be completed within the MRA-LIA (Figure 1-2) for a total area of approximately 400 acres (Figure 1-3) and is based on limited available funding. The total land area of the removal action area is approximately 440 acres; however, areas inundated by water or areas with standing water will not be addressed as part of this removal action. The objective of the TCRA/IM is to reduce risks at MRSs identified as posing an explosive hazard due to MEC present on the ground surface. The primary risk is posed to unauthorized personnel accessing the areas identified on Figure 1-3. Access to the areas identified for removal are currently restricted; however, trespassing occurs regularly in these areas. The restrictions to these areas are currently not anticipated to be lifted. The objectives will be met by removing all MEC present on the ground surface or exposed at the ground surface.

This TCRA is administered and managed by NAVFAC Atlantic with quality assurance (QA) support from the Resident Officer in Charge of Construction (ROICC) personnel at Naval Activity Puerto Rico (NAPR). The Title II Services contractor will support NAVFAC Atlantic by providing site management, QA support to the ROICC, contract administration, and data management. The removal action will be performed by a removal action contractor who is contracted directly by NAVFAC Atlantic. The removal action contractor will perform all MEC removal action operations, implement safety processes, perform quality control (QC), and will subcontract all support personnel as needed to carry out the removal action.

This Work Plan is intended to comply with the guidance for conducting TCRAs under the Comprehensive Environmental Restoration, Compensation, and Liability Act (CERCLA; USEPA, January 1993) and was prepared by CH2M HILL under Navy Contract N62470-02-D-3052, Navy Comprehensive Long-Term Environmental Action Navy (CLEAN), District III, Contract Task Order 047.

1.2 Site History

The Navy has owned portions of Vieques since 1941, when land was purchased for use as ammunitions storage facility in support of World War II training requirements. Although the Island of Culebra was the focal point for naval gunfire in the 1960s and early 1970s, VNTR, formerly known as the Atlantic Fleet Weapons Training Facility (AFWTF), began developing facilities on the eastern end of Vieques in 1964, when it established a gunnery range in the LIA. In 1965, the Navy established the LIA, also known as the Air Impact Area, and began construction of Observation Point (OP) 1 on Cerro Matias.

By the 1970s, the LIA maintained several targets for aerial bombing including old tanks and vehicles used as mock-ups, two bulls-eye targets and a strafing target. Additionally, several point and area targets for ships to practice naval gunfire support (NGFS) were established in the LIA. The locations of these targets are shown on Figure 1-4.

The Environmental Impact Statement (EIS) for Vieques (Tippetts, et al., 1979) provides a detailed discussion on the development of training facilities in the VNTR leading up to 1979. The VNTR provided logistics support, scheduling assistance, and facilities for NGFS and air-to-ground (ATG) ordnance delivery training for Atlantic Fleet ships, North Atlantic Treaty Organization (NATO) ships, air wings, and smaller air units from other allied nations and the Puerto Rican National Guard. The Fleet Marine Force, Atlantic (FMFLANT), conducted training for Marine amphibious units, battalion landing teams, and combat engineering units in the Eastern Maneuver Area (EMA). Occasionally, naval units of allied nations having a presence in the Caribbean and the Puerto Rican National Guard also utilized the EMA.

Adjacent to and west of the Surface Impact Area (SIA), the 10,673-acre EMA provided maneuvering space and ranges for the training of marine amphibious units and battalion landing teams in exercises of amphibious landings, small-arms fire, artillery and tank fire, shore fire control, and combat engineering tasks. The EMA was first established in 1947. It is demarcated by the western property line east to the western front friendly-fire line where the SIA begins. Marine artillery was fired from gun positions in the EMA and SIA toward targets in the LIA and SIA. Figure 1-4 presents a map showing the locations of the primary target areas, artillery gun positions and ranges established by the 1970s.

Portions of the training areas within the VNTR were in continuous use since World War II, when the Navy acquired title to the land, until 2003. The Atlantic Fleet's ships, aircraft, and marine forces carried out training in all aspects of NGFS, ATG ordnance delivery, air-to-surface mine delivery, amphibious landings, small-arms fire, artillery and tank fire, and combat engineering. As part of normal operations, unexploded ordnance (UXO) was cleared periodically from the LIA and treated on-site by detonation. The Navy also operated a waste munitions open burn and open detonation (OB/OD) facility under a USEPA interim status Subpart X permit within the LIA.

1.3 Site Location

1.3.1 Former Vieques Naval Training Range (VNTR)

Vieques is located in the Caribbean Sea approximately 7 miles southeast of the eastern tip of the island of Puerto Rico and 20 miles southwest of St. Thomas, U.S. Virgin Islands. Vieques is the largest offshore island of the Commonwealth of Puerto Rico. It is approximately 20 miles long and 4.5 miles wide, and has an area of approximately 33,088 acres (51 square miles). Figure 1-1 shows the location of Vieques with respect to the island of Puerto Rico.

The former VNTR is situated in the eastern half of the Island of Vieques, and is bordered on the west by the community of Isabel Segunda, to the north by Vieques Sound, and to the south by the Caribbean Sea. The former VNTR consist of approximately 14,500 acres and is divided operationally into four MRAs that (from west to east) include: the EMA, an area approximately 10,673 acres; the SIA, approximately 2,500 acres; the 900-acre Live Impact Area (LIA) and the 200-acre Eastern Conservation Area (ECA) on the easternmost tip of Vieques. Figure 1-4 presents a site map of VNTR.

1.3.2 Munitions Response Area—Live Impact Area

In 1965, ATG training activity began in the MRA-LIA where several mock-ups, such as old tanks and vehicles, were used as targets for aerial bombing. Since the mid-1970s, naval gunfire was practiced at the MRA-LIA, where several point and area targets for ships were constructed. Locations of the ATG bombing targets and the naval gunfire targets in the MRA-LIA are shown on Figure 1-4. Based on the naval gunfire and ATG gunfire that occurred from the 1970s through 2003, the entire 900 acres of the LIA has been impacted by MEC.

1.3.3 Area for Performance of Time Critical Removal Action

A TCRA will be carried out at MRA-LIA MRSs 1 through 4, 6, 16, 17, and 30. These areas are identified on Figure 1-3. These MRSs have been selected based on the high explosive hazards associated with the munitions identified at these locations and due to the trespassing of recreational boaters in these areas from the north and south of the MRSs. Table 1-1 lists the MRSs where the TCRA will be performed and past use. Numerous different munitions items have been used at these sites and they include, but are not limited to: 5-inch/54-caliber (5"/54), 5"/38, 4.5"/38, 3"/50, MK-16 and Mk-84 bombs, and submunitions. Table 1-2 lists the recorded munitions used at the VNTR from the 1970s through 1990s.

1.4 Topography, Climate and Weather, Vegetation, Geology, and Hydrology

1.4.1 Topography

The topography of Vieques is characterized by gentle to steep rolling hills and valleys throughout the island, with the eastern side exhibiting a more rugged terrain. Figure 1-5 illustrates the topography of the VNTR. The LIA is relatively flat with elevations ranging from 0 to approximately 50 ft above mean sea level (amsl). Cerro Matias, located within the EMA as OP-1 (Figure 1-5) is the highest point on VNTR, at approximately 420 ft amsl. The

average elevation across Vieques is approximately 246 ft amsl. The coastal area is relatively narrow; however, the southern coast exhibits wider expanses of beach.

TABLE 1-1

MRA-LIA MRSs Included in TCRA

Time Critical Removal Action/Interim Measures Work Plan, Vieques, Puerto Rico

MRS	Historical Use
1	SAM west-site, NGF target area
2	NGF target area
3	ATG targets
4	ATG targets
5	
6	ATG targets
7	ATG targets
8	ATG targets
13	Mock runway/ATG target
15	ATG targets
16	OB/OD site and ATG targets
17	OB/OD site and ATG targets
18	ATG targets
19	ATG targets
20	ATG targets
29	
30	ATG targets
31	ATG targets

SAM - Surface-to-Air Missile, NGF - Naval Gunfire, ATG - Air-to-Ground, OB/OD - open burn/open detonation

TABLE 1-2

Munitions Items Reported to Have Been Fired at the Former VNTR

Time Critical Removal Action/Interim Measures Work Plan, Vieques, Puerto Rico

Royal Navy 4.5-Inch (HE)
3-Inch/50 (HE)
5-Inch/38 (HE)
5-Inch/54 (HE & TP)
16-Inch/50 (HE & TP)
81mm Mortar (WP) (Simulate Counter-Battery Fire)
MK 80-series Bombs (HE, TP, & Inert)
MK 118 Sub-munitions (HEAT & Inert)
MK 77 Sub-munitions (HEDP)

TABLE 1-2

Munitions Items Reported to Have Been Fired at the Former VNTR
Time Critical Removal Action/Interim Measures Work Plan, Vieques, Puerto Rico

BLU-97 Sub-munitions (HEAT)
BLU-63/86 Sub-munitions(HE)
AGM 114 HELLFIRE Missile (HEAT)
2.75" and 5" Rockets (HE, WP, & Inert)
20/25/27/30mm A/C Ammo (HE & TP)
MK 76 & BDU 33 Practice Bombs
M-47 DRAGON Missile (HEAT)
AT4 Missile (HEAT)
LAW Rocket (HEAT)
SMAW Rocket (HE & HEAT)
60/81/107mm Mortars (HE & WP)
105/155/175mm & 8-Inch Projectiles (HE)
40mm Projected Grenades (HE & HEDP)
Hand Grenades (HE & Smoke)

1.4.2 Climate and Weather

The climate of Vieques is tropical-marine. Temperatures are nearly constant, with an annual average of approximately 79 degrees Fahrenheit (°F). August is the warmest month (82°F) and February is the coolest (76°F). Vieques lies directly in the path of the prevailing easterly trade winds that regulate the climate of Puerto Rico and result in a rainfall pattern characterized by a dry season from December through July and a rainy season from August through November. Heavy precipitation may be induced by tropical storms from June to November. The eastern half of Vieques and annual rainfall averages 25 inches per year.

1.4.3 Vegetation

Vegetative cover on the eastern third of Vieques consists of thick vegetation dominating most available land space. The canopy consists primarily of deciduous trees, with the non-native mesquite dominating the species distribution. A number of tree species are thorny, and low-lying brush is present throughout. Tall grasses also populate the landscape in areas where the thorny tree and brush species have not populated. Most of the former VNTR's vegetation tends to form a complete ground cover. Leaves are mostly small and sclerophyllous (hard and dry).

Vegetation on the island's eastern side is slightly less dense than on the western side, with a larger percentage of thorny species, especially young to mid-age mesquite trees. Lower

precipitation levels on the island's eastern end contribute to the thornier, rugged terrain observed there. The hillsides are densely vegetated, similar to the western side of the island.

The coastal areas in the island's eastern side contain level terrain made up primarily of lagoons and mangrove swamps. Coastal dunes and associated vegetation, including sea oats, are present throughout open beach areas on both the northern and southern sides of the EMA and SIA.

1.4.4 Geology

The geology of Vieques is characterized by volcanic rocks generally overlain by alluvial deposits and patches of limestone. The upland areas contain three rock types consisting of sedimentary rocks composed of limestone and volcanic rocks composed of granodiorite and diorite.

The Upper Cretaceous volcanic rocks in the upland areas appear to be the oldest exposed rocks on Vieques, and are believed to have been in a marine environment, as were rocks of the same age on the island of Puerto Rico. Limestone of Upper Tertiary age is found on peninsulas extending into the sea from the southern and eastern coasts. Limestone of the Tertiary-Miocene age is also found along these coasts, and is referred to as the "Puerto Ferro" limestone. Quaternary age deposits are found in the valleys and coastal areas and include beach, swamp, and alluvial deposits. Deposits of sand, swamp, and salt mud occur in the coastal areas and floodplains.

Limestone occurs in sectors of the island's northern, southern, and eastern parts. The most extensive areas of limestone are found on the southern coastal peninsulas. The limestone is generally soft, yellowish, and well-indurated where exposed to the atmosphere. The sedimentary deposits consist of a mixture of sand, silt, and clay.

Alluvial deposits are found in the valleys and coastal areas and include beach, swamp, and alluvial deposits. Deposits of sand, swamp, and salt mud occur in the coastal areas and floodplains. A recent investigation of the eastern end of Vieques indicated that the alluvial deposits there range from 5 to 50 ft thick (Baker, 1999).

Soils on Vieques Island are primarily residual, due to both climatic and subsurface rock conditions. They typically are classified into five groups and range from rock land soils where bedrock is exposed to deep, well-drained soils within the alluvial deposits to shallow soils (U.S. Department of Agriculture [USDA], 1977).

1.4.5 Hydrology

The streambeds found on Vieques flow either northerly or southerly until they reach the Caribbean Sea or Atlantic Ocean. Vieques does not have any perennial surface drainage, and receives an average of 36 inches of rainfall per year, of which approximately 90 percent is lost to evaporation, based on statistics from the U.S. Virgin Islands. Of the remaining 10 percent, approximately 5 percent infiltrates into the groundwater system and 5 percent becomes surface runoff.

1.4.6 Surface Water

Surface water deposits in the VNTR occur primarily in coastal lagoons and intermittent streams, known locally as arroyos and quebradas that channel water downward from hills during rain events. Some of these arroyos and quebradas have standing water year-round, especially in areas abutting the coastline where terrain has leveled sufficiently to allow for standing water. Several mid- to large-sized lagoons are present near the Purple Beach area just east of Puerto Negro and to the south within the Ensanada Honda area, the Bahía de la Chiva area, and the South Coast Bays area.

Surface water features are less prominent on the island's eastern side than they are on the western side, and exist primarily very close to the coast as lagoons. Some rainwater does pool for some time in low-lying areas following storm events, but these features dissipate within a few days.

1.4.7 Groundwater

The groundwater on Vieques is derived from rainfall. The water flows downhill as intermittent stream runoff or seeps into the soil and underlying deposits. Water in pore space, cracks, and fractures in bedrock eventually flows into alluvial deposits or to the ocean. Yearly variations in island-wide rainfall influence groundwater levels locally. Ground levels also exhibit fluctuations near the coastline because of tidal influences.

Two types of aquifers are present on Vieques. The first is found in the upper portion of the bedrock and sedimentary rocks in the EMA. At the eastern end of Vieques, a groundwater divide occurs near the center of the island. From this location, the groundwater flow is toward the northeast and the southwest (Baker, 1999). The second type of aquifer is within the alluvial deposits found below the hills in the low flat valleys along the coast. The Camp Garcia aquifer is an alluvial aquifer within Esperanza Valley, the largest alluvial valley in Vieques.

The Valle de Esperanza aquifer is located beneath the island's southern portion near Camp Garcia. As discussed above, approximately 5 percent of the annual precipitation infiltrates through the ground and supplies the aquifer. The aquifer was previously used as a source of drinking water by the Navy. The Puerto Rico Aqueduct and Sewer Authority (PRASA) managed a series of 16 wells which pumped approximately 450,000 gallons of water per day, although these wells are no longer active because of the installation of a water line from the island of Puerto Rico to Vieques in 1978.

The USGS performed a groundwater study on Vieques, including tests on the wells near Esperanza. The results indicated that the groundwater contained high concentrations of sodium bicarbonate. Because of its high sodium content, the groundwater on Vieques is not suitable for extended use for irrigation or other potable water use. The high levels of sodium result from sea spray infiltrating into the ground and saltwater entering the groundwater supply through excessive groundwater withdrawal (Vargas, 1995).

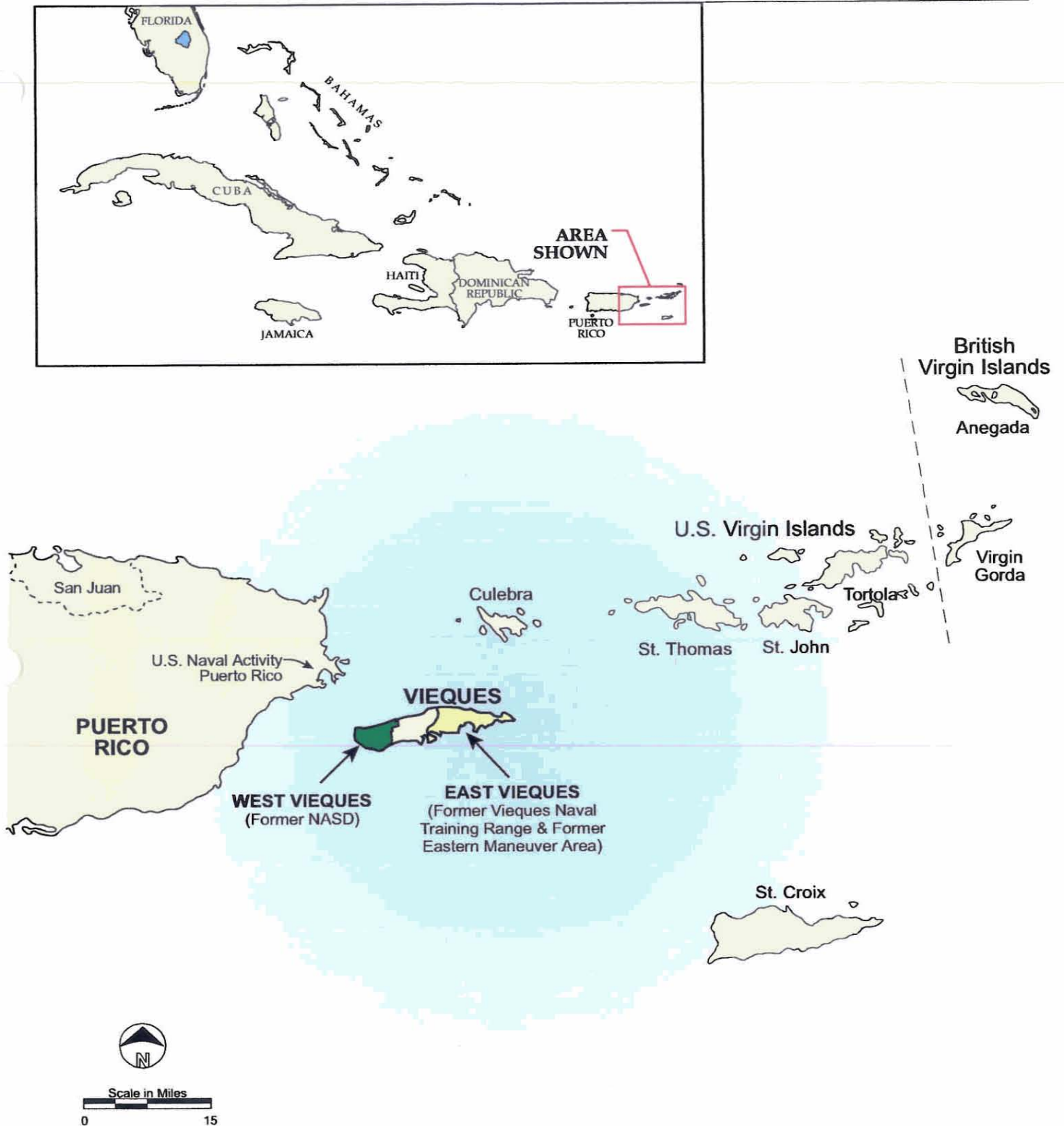
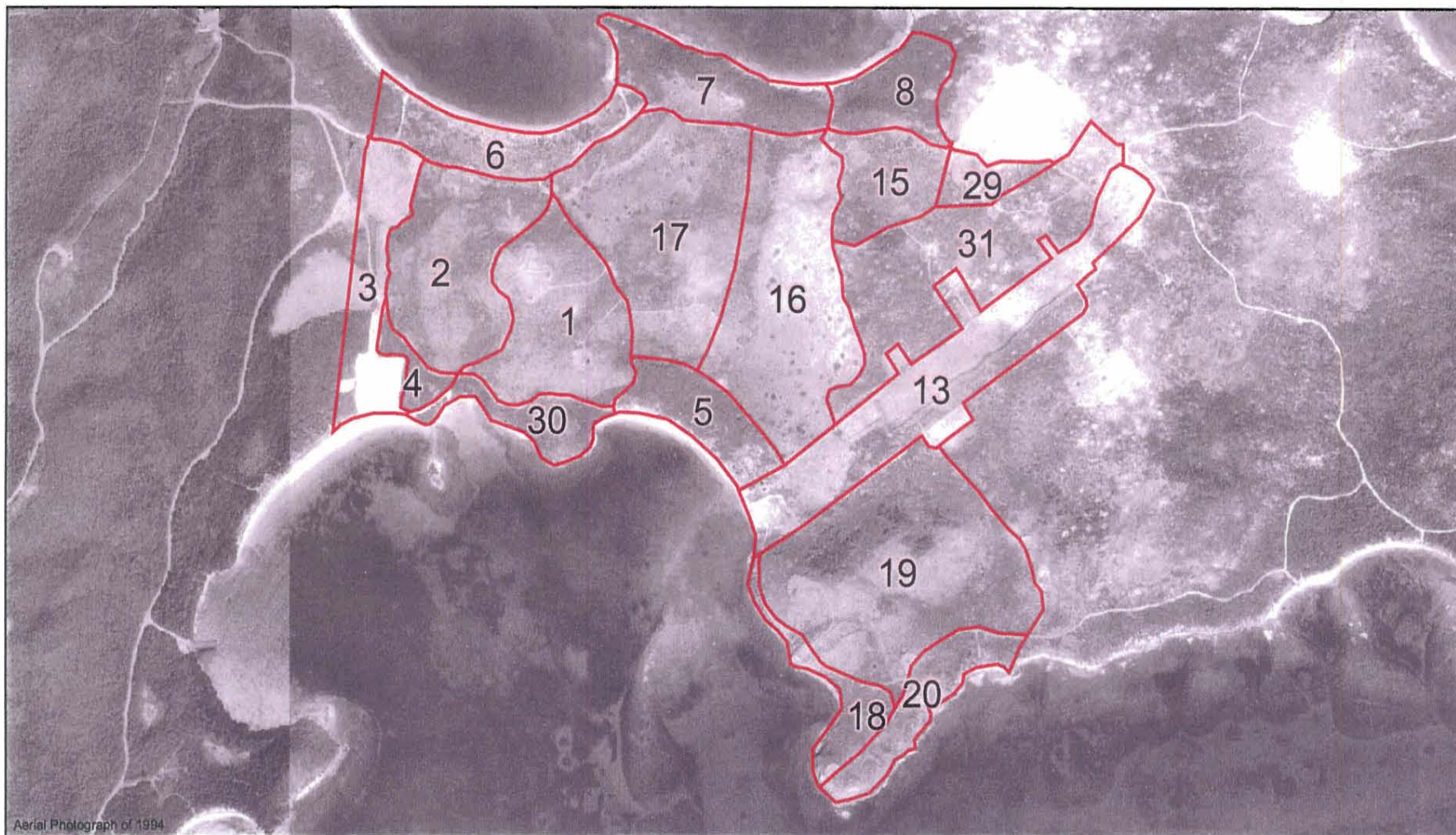


Figure 1-1
Regional Location Map
Vieques, Puerto Rico



Aerial Photograph of 1994

Legend

MRS Boundaries

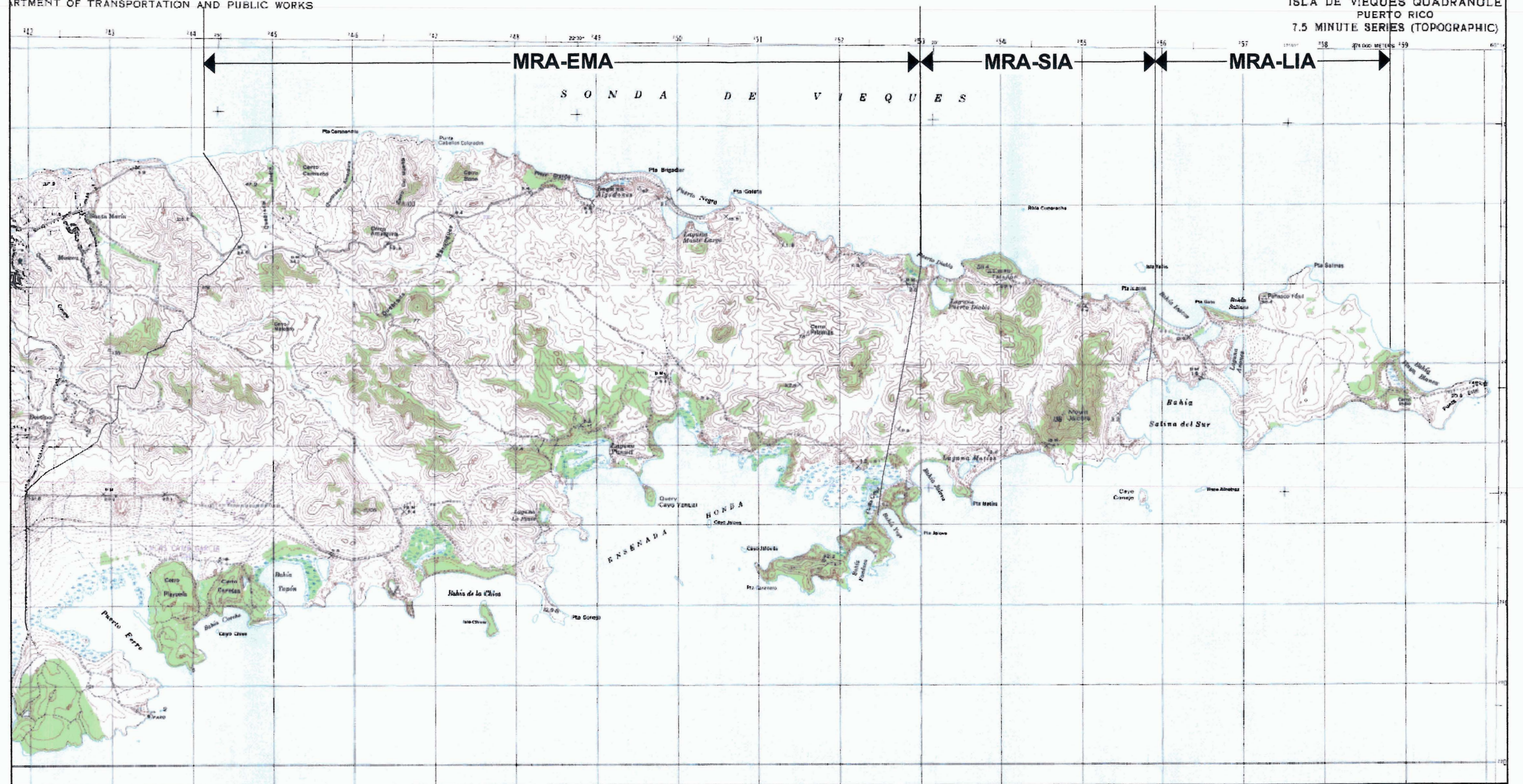
Note: See Figure 1-2 for reference



0 150 300
Meters

Figure 1-3
TCRA Areas
Former VNTR
Vieques, Puerto Rico

CH2MHILL



MRAs - Munitions Response Areas
EMA - Eastern Maneuver Area
LIA - Live Impact Area
SIA - Surface Impact Area

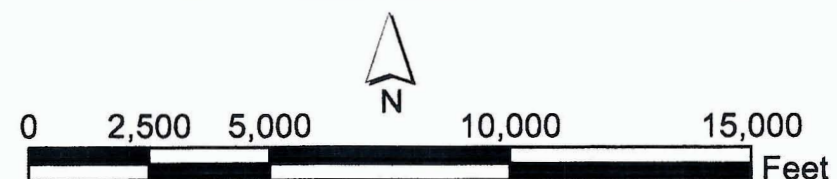


Figure 1-5
Topographic Map
Former VNTR,
Vieques, Puerto Rico

Technical Management Plan

2.1 General

This section of the work plan addresses specific field-level approach and procedures to execute the tasks required for the TCRA in the the LIA. Proposed changes to this work plan will be documented and forwarded to NAVFAC and the Title II Services Contractor. Proposed changes to this work plan will be presented to USFWS, NOSSA, USEPA, and PREQB for review and comment.

2.2 Guidance, Regulations, and Policy

The following MEC guidance, regulations, and policy are applicable or potentially applicable during MEC assessment, recovery, and removal operations on the VNTR.

TABLE 2-1

Potentially Applicable or Relevant and Appropriate Requirements (ARARs) and Guidance To Be Considered

Reference	Title
Federal Requirements	
27 CFR Part 55	Commerce in Explosives
29 CFR Part 1910	Occupational Safety and Health Standards
29 CFR Part, Subpart T, 1910.401	Commercial Diving Operations
29 CFR Part 1926	Safety and Health Regulations for Construction
40 CFR Part 300	National Oil and Hazardous Substances Pollution Contingency Plan (CERCLA Process)
40 CFR Parts 260-279	Hazardous Waste Management (RCRA ARARs)*Military Munitions Rule
40 CFR Parts 355, 370, and 372	Emergency Planning & Community Right-to-Know (Inventories and Release Reporting)
40 CFR Parts 50-73	Clean Air Act (Release Limits)
49 CFR Parts 100-199	Department of Transportation (Truck Transportation on Public Roads)
Bureau of Alcohol, Tobacco and Firearms P 5400.7 (09/00)	Federal Explosives Law and Regulations 2000
Department of Defense (DoD)	
DoD 4160.21-M	Defense Reutilization and Marketing Manual
DoD 4160.21-M-1	Defense Demilitarization Manual
DoD 4715.11	Environmental and Explosives Safety Management on Department of Defense Active and Inactive Ranges Within the United States
DoD 4715.12	Environmental and Explosives Safety Management on Department of Defense Active and Inactive Ranges Located Outside the United States
DoD 6055.9-STD	Ammunition and Explosives Safety Standards
Department of the Army	
AR 50-6	Nuclear and Chemical Weapons and Material, Chemical Safety
AR 75-14	Inter-service Responsibilities for Explosive Ordnance Disposal
AR 190-11	Physical Security of Arms, Ammunition, and Explosives
AR 350-4	Integrated Training Area Management

TABLE 2-1
Potentially Applicable or Relevant and Appropriate Requirements (ARARs) and Guidance To Be Considered

Reference	Title
AR 385-10	The Army Safety Program
AR 385-30	Safety Color Code Markings and Signs
AR 385-61	The Army Chemical Agent Safety Program
AR 385-62	Regulations for Firing Guided Missiles, and Heavy Rockets for Training, Target Practice, and Combat
AR 385-63	Procedures for Firing Ammunition for Training, Target Practice, and Combat
AR 385-64	U.S. Army Explosive Safety Program
AR 740-32	Responsibilities for Technical Escort of Dangerous Materials
DACS-SF Ltr 30Jun00	Explosive Safety Policy for Real Property Containing Conventional Ordnance and Explosives
DAP 385-64	Ammunition and Explosives Safety Standards
TB 700-4	Technical Bulletin – Decontamination of Facilities and Equipment
U.S. Army Corps of Engineers	
EM 385-1-1	Safety and Health Requirements Manual
EM 1110-1-4009	Ordnance and Explosives Response
EP 75-1-2	Unexploded Ordnance Support for Hazardous, Toxic and radioactive Waste and Construction Support Activities
EP 385-1-95a	Basic Safety Concepts and Considerations for Ordnance Explosive Operations
EP 1110-1-17	Establishing a Temporary Open Burn/ Open detonation Site for Conventional Ordnance and Explosives Projects
EP 1110-1-18	Ordnance and Explosives Response
EP 1110-1-24	Establishing and Maintaining Institutional Controls for Ordnance and Explosives Projects
ER 5-1-11	Program and Project Management
ER 385-1-92	Safety and Occupational Health Document Requirements for Hazardous, Toxic, and Radioactive Waste and Ordnance and Explosive Activities
ER 415-1-10	Contractor Submittal Procedures
ER 715-1-19	Service and Supply Contractor Performance Evaluations
ER 1110-1-12	Quality Management
ER 1110-1-8153	Engineering and Design Ordnance Explosives Response
ER 1110-1-8158	Corps Wide centers of Expertise Program
U.S. Army Corps of Engineers Engineering and Support Center (CEHNC), Huntsville	
Interim Guidance Documents	
IGD 98-04	Reportable Material at Ordnance Explosives Response Sites
IGD 99-02	Small Arms Determination
Procedural Documents and Plans	
March 2000	Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives Sites
August 10, 1999	Procedures for Establishment of Anomaly Review Boards Site/Grid Statistical Sampling Based Methodology (SiteStats/GridStats) Documentation
Memoranda of Agreement (MOA)	
MOA (July 18, 1997)	U.S. Army 52nd Ordnance Group and U.S. Army Engineering and Support Center, Huntsville
MOA (June 13, 1995)	Chemical Support Division, U.S. Army Edgewood Research, Development

TABLE 2-1
Potentially Applicable or Relevant and Appropriate Requirements (ARARs) and Guidance To Be Considered

Reference	Title
	and Engineering Center and (then) U.S. Army Engineer Division, Huntsville
OE Guidance Memoranda	
	OE Mentoring Plan
December 19, 2000	Interim Final Management Principles for Implementing Response Action at Closed, Transferring, and Transferred Ranges
January 20, 1994	Application of the Hazardous Waste Operations and Emergency Response Regulation to Ordnance and Explosives Sites
November 27, 1996	Base Realignment and Closure (BRAC) Ordnance and Explosives (OE) Response Projects
May 7, 1997	Coordination with the Ordnance and Explosives Center of Expertise (OE CX)
July 6, 1994	OE Center of Expertise Technical Advisory Group (TAG) for Archive Search Reports (ASRs)
	Permit Equivalency Process for CERCLA Onsite Actions
	Sample Land Owner Notification Letters to be used in Support of DERP FUDS
NAVSEA OP 5 Vol 1	Ammunition and Explosives Ashore: Safety Regulations for Handling, Storing, Production, Renovation, and Shipping
NAVSEA OP 2165	Navy Transportation Safety Handbook for Ammunition, Explosives, and Related Hazardous Materials
NAVSEA OP 2239	Motor Vehicle Driver's Handbook, Ammunition, Explosives, and Related Hazardous Materials
NAVSEA 4570.1	Demilitarization and Disposal of Excess, Surplus, and Foreign Excess Ammunition, Explosives and Other Dangerous Articles and Inert Ordnance Material
NAVSEA 8020.9	Non-Nuclear Ordnance AND Explosives Handling Qualification and Certification Program
NAVSEAINST 8020.1H	DOD Ammunition and Explosives Hazard Classification Procedures Joint Technical Bulletin
OPNAVINST 5090.1	Environmental and Natural Resources Protection Manual
OPNAVINST 5100.23E	Navy Occupational Safety and Health Program
OPNAVINST 5102.1C	Mishap Investigation and Reporting
OPNAVINST 5530.13	Department of the Navy Physical Security Instruction for Sensitive Conventional Arms, Ammunition, and Explosives
OPNAVINST 8020.14	Department of the Navy Explosives Safety Policy
OPNAVINST 8023.2	U.S. Navy Explosives Safety Policies, Requirements, and Procedures
OPNAVINST 8026.2	Assignment for the Responsibility for Management of the Navy Munitions Disposition Program
OPNAVINST 8026.2A	Navy Munitions Disposition Policy
OPNAVINST 8027.1	Inter-service Responsibilities for Explosive Ordnance Disposal
OPNAVINST 8027.6E	Naval Responsibilities for Explosive Ordnance Disposal
OPNAVINST 8070.1B	Responsibilities for Technical Escort of Dangerous Materials
SECNAVINST 8023.3C	Responsibilities for Issuance and Administration of Waivers and Exemptions from Department of Defense Explosive Safety Standards
SWO60-AA-MMA-010	Demolition Materials
U.S. Marine Corps	
MCO P3570.1B	Policies and Procedures for Firing Ammunition for Training, Target Practice, and Combat

TABLE 2-1

Potentially Applicable or Relevant and Appropriate Requirements (ARARs) and Guidance To Be Considered

Reference	Title
MCO P3570.2	Regulations for Firing Guided Missiles, and Heavy Rockets for Training, Target Practice, and Combat
MCO 3571.2	Explosive Ordnance Disposal Program
MCO 8020.1	Handling, Transportation, Storage, Reclassification and Disposal of Class V (W) Material
MCO 8020.10	Ammunition and Explosives Safety Policies, Programs, Requirements, and Procedures for Class V Material
MCO P8020.11	Department of the Navy Explosives Safety Policy
MCO 8023	Qualification and Certification Program for Class V Munitions and Explosive Devices
MCO 8027.1	Inter-service Responsibilities for Explosive Ordnance Disposal
Environmental Protection Agency (EPA)	
July 26, 2000 (Draft)	EPA FUDS Policy
42 U.S.C. Section 9601	Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980
42 U.S.C. Section 11001	Superfund Amendments and Reauthorization Act (SARA) of 1986
March 2000 (Draft)	Handbook on Management of Unexploded Ordnance at Closed, Transferring, and Transferred Ranges
42 U.S.C. Section 6901	Resource Conservation and Recovery Act
Title 126	Hazardous Waste Regulations*
Title 126	Emergency Planning & Community Right-to-Know and Contingency Planning Regulations (Reporting Requirements)
Title 129	Air Quality Regulations (Release Limits)

CFR = Code of Federal Regulations

RCRA = Resource Conservation and Recovery Act

* denotes substantive requirements of this regulation only

2.3 Project Organization and Personnel

This TCRA is administered and managed by NAVFAC Atlantic with quality assurance (QA) support from the Resident Officer in Charge of Construction (ROICC) personnel at Naval Activity Puerto Rico (NAPR). The Title II Services contractor will support NAVFAC Atlantic by providing site management, QA support to the ROICC, contract administration, and data management. The removal action will be performed by a removal action contractor who is contracted directly by NAVFAC Atlantic. The removal action contractor will perform all MEC removal action operations, implement safety processes, perform quality control (QC), and will subcontract all support personnel as needed to carry out the removal action. Figure 2-1 gives the general areas of responsibility for each entity described above.

The Title II Services Contractor Munitions Response (MR) Manager will support Quality Assurance services performed by the Navy and ensure that the work is completed in accordance with the requirements of the work plans and DoD/Navy Guidance.

The Removal Action Contractor Project Manager is responsible for ensuring all activities performed are conducted in accordance with contractual specifications and approved Work

Plans. The MRP Contactor Project Manager is responsible for management of all operations conducted for the project. He will ensure all personnel assigned to the project, including subcontractors, have reviewed the technical plans before any task associated with the project begins. The Project Manager will monitor the budget and schedule to ensure availability of necessary personnel, equipment, subcontractors, and services. He will participate in the development of the field program, evaluation of data, and reporting.

The Senior UXO Supervisor (SUXOS) is the senior UXO Technician onsite. He controls operations of all field teams performing MEC activities and will spend most of the day in the field monitoring their performance and helping them achieve maximum operational safety and efficiency. He reports directly to the Project Manager and receives guidance from the Title II Services Contractor MEC Manager concerning technical UXO and operational issues. He will implement the approved plans in the field and must review and approve any changes. He supervises all UXO teams on a project, not to exceed a total of 10. The SUXOS is authorized to temporarily stop work to correct an unsafe condition or procedure. The SUXOS will meet or exceed the requirements for that position as presented in the DDESB approved "UXO Personnel Training and Experience Hierarchy" found in Technical Paper Number 18 - Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel, 2004.

The Project Superintendent is responsible for all fieldwork performed by the MRP Contractor at the VNTR and will coordinate with the SUXOS to ensure there are no conflicts in operations (except for operations where a SUXOS is in charge of MEC activities). The Superintendent is responsible for overseeing scheduling and ensuring that field related activities are performed in accordance to the specified plans.

UXO Technician III (UXOTIII) personnel, also referred to as field team leaders, are responsible for the safety and efficiency of the performance of their assigned field team, and report directly to the SUXOS. The UXO Technician III can temporarily stop work in order to bring an unsafe condition or procedure to the attention of the SUXOS. The UXO Technician III will meet or exceed the requirements for that position as presented in the DDESB approved "UXO Personnel Training and Experience Hierarchy" found in Technical Paper Number 18 - Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel, 2004.

UXO Technician II (UXOTII) personnel report directly to their assigned UXO Technician III and are responsible for the safe and efficient performance of specific field tasks as assigned by the UXO Technician III. They are also responsible for complete familiarity with the approved plans and for adherence to the procedures described in the plans. A UXO Technician II has the authority to temporarily stop work in order to bring an unsafe condition or procedure to the attention of their assigned UXO Technician III. The UXO Technician II will meet or exceed the requirements for that position as presented in the DDESB approved "UXO Personnel Training and Experience Hierarchy" found in Technical Paper Number 18 - Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel, 2004.

UXO Technician I (UXOTI) personnel report directly to their assigned UXO Technician II or III and are responsible for the safe and efficient performance of specific field tasks as assigned. They are also responsible for complete familiarity with the approved plans and for

adherence to the procedures described in the plans. A UXO Technician I has the authority to temporarily stop work in order to bring an unsafe condition or procedure to the attention of their assigned UXO Technician II or III. The UXO Technician I will exceed the requirements of the DDESB-approved "UXO Personnel Training and Experience Hierarchy."

UXO Sweep Personnel (UXOSP) assist UXO Technicians and supervisory personnel in the clearance of MEC, operating only under the direct supervision of a qualified UXO Technician III. This position requires site and job specific contractor training (which may include ordnance recognition, safety precautions, donning and doffing personnel protective equipment, etc.) but does not require UXO Technician qualifications. UXOSP are not involved in the execution of explosives operations and shall not have intentional physical contact with MEC. The UXOSP will exceed the requirements of the DDESB-approved "UXO Personnel Training and Experience Hierarchy."

UXO Safety Officer (UXOSO) will implement the SSHP, inclusive of the MEC and HTRW components, and will verify compliance with applicable safety and health requirements. On the VNTR MEC sites, the UXOSO reports independently of project management to the Program CIH. The UXOSO implements the approved explosives and UXO safety program in compliance with all DoD, federal, state, and local statutes and codes; analyzes UXO and explosives operational risks, hazards, and safety requirements; establishes and ensures compliance with all site-specific safety requirements for UXO and explosives operations; enforces personnel limits and safety EZs for UXO clearance operations, UXO and explosives transportation, storage, and destruction; conducts safety inspections to ensure compliance with UXO and explosives safety codes; and operates and maintains air monitoring equipment required at site for airborne contaminants. The UXOSO is authorized to temporarily stop work to correct an unsafe condition or procedure. The UXOSO will meet or exceed the requirements for that position as presented in the DDESB approved "UXO Personnel Training and Experience Hierarchy" found in Technical Paper Number 18 - Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel, 2004.

The UXO Quality Control Specialist (UXOQCS) implements the UXO-specific sections of the QC Program for all MEC-related activities, conducts QC inspections of all UXO and explosives operations for compliance with established procedures, and directs and approves all corrective actions to ensure all MEC-related work complies with contractual requirements. The UXOQCS has the authority to temporarily stop work to correct an unsafe condition or procedure. On VNTR MEC sites, the UXOQCS reports independently of project management to the Program QC Manager. The UXOQCS will meet or exceed the requirements for that position as presented in the DDESB approved "UXO Personnel Training and Experience Hierarchy" found in Technical Paper Number 18 - Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel, 2004.

2.3.1 Composition and Management of Investigation/Removal Teams

Each UXO Team will consist of one UXO Technician III and six or less team members. Teams will have a minimum of two UXO-qualified personnel, one of which will be the UXO Technician III. Teams performing actual physical removal of MEC (as opposed to brush cutting teams, etc.) shall be composed entirely of UXO-qualified personnel.

Each field team will be directly supervised by an UXO Technician III who will in turn report to the SUXOS. These may include brush clearing teams, UXO Sweep Personnel teams, and laborer teams.

The SUXOS will supervise no more than 10 UXO Technician III. There will be no more than one SUXOS on an MR project without prior approval of the Contracting Officer.

The UXOSO and UXOQCS duties may be performed by the same person.

The UXOSO and UXOQCS will not be directly involved in any MEC removal or investigation tasks.

A UXOQCS may not be required full-time onsite. However, QC functions will be performed for all field activities. The UXOQCS will ensure a quality product in the field without compromising safety.

The UXO Technician I will not determine whether or not MEC is safe to move.

UXO Sweep Personnel will not excavate anomalies or handle MEC. If these personnel are performing required work, they may remain in the EZ during anomaly investigation.

2.4 Technical Scope

2.4.1 Mobilization

Prior to mobilization, the following actions require advance planning in preparation for mobilization:

- Finalize procurement actions for items and services needed during the mobilization.
- Coordinate with the Federal Aviation Administration (FAA) for release of "Notice to Airmen" (NOTAM) if regular detonations are expected.
- Coordinate with the US Coast Guard for the release of a "Notice to Mariners" if regular detonations are expected.
- Notify local response agencies (police & fire departments) of upcoming project activities.
- Coordinate with USFWS representatives on Vieques Island.

A mobilization period is necessary to organize and train project staff; inventory and test equipment. Mobilization activities will include:

- Transport and assembly of the work force.
- Conduct site-specific training on the work plan, SSHP, and MEC procedures and hazards.
- Ship and inventory project equipment including hand tools and supplies, portable toilets, backhoes, vegetation clearance equipment, etc.
- Coordinate with local agencies including police, hospital, and fire department as appropriate.
- Organize support facilities and test communication equipment.

- Test and inspect equipment.

2.4.2 Field Office

A field office will be established within the Camp Garcia section on Vieques. The field office is the central command location for MEC activities. Personnel will report to this location at the beginning of each work day for the daily health and safety briefing. The field office is the central point of communications for the project. The office will be equipped with one or more phones, facsimile machine, and radio base station for radio communication with the field crew(s). Health and safety records will also be maintained in the field office.

2.4.3 Project Site Layout

The area identified for removal of surface munitions is 400 acres in area and is described in Section 1 and shown on Figures 1-2 and 1-3. The survey to establish the project site layout includes the actions performed to identify the operating area boundaries, install grid corner stakes, and develop a project base map.

Following an initial reconnaissance of the work area, the survey team will locate and mark the site boundaries with stakes and establish ground controls in accordance with the location, surveying, and mapping plan. The spatial coordinates collected during the establishment of the survey monuments, operating area boundary, and individual grids will be used to develop a project base map.

The final product of this operation is the generation of a spatially-referenced site drawing that accurately depicts the location operating area boundaries and grid boundaries. Throughout operations, this map will be continually updated to reflect project performance and contamination encountered. Upon project completion, the data contained on this map will be an integral part of the final report.

The locations of all stakes will be checked for the presence of MEC using an appropriate geophysical instrument prior to driving the stake.

The project site will be divided into grids measuring 30 meters x 30 meters.

2.4.4 Site Preparation

All site preparation activities will be monitored by the appropriate UXO personnel described in this section.

A survey team will perform initial reconnaissance of the site upon mobilization. During the initial reconnaissance, the survey team will examine the site to determine the amount of vegetative material that must be removed to accomplish the scope of work and determine the amount of MEC and range/ munitions debris on the surface of the site. The survey team will document the site reconnaissance. Photographs will be taken of the overall site vegetation, MEC, debris found on the surface, and any other notable features.

The survey team's observation, documentation, and analysis of the density of the vegetation and the presence of surface MEC will be used to determine the amount and method of vegetation removal. Possible appropriate vegetation removal scenarios include none, (if the area is free of vegetation that interferes with subsequent required work); mowing (in areas

that are heavily vegetated but have little or no signs of shock-sensitive MEC on the surface); or removal by hand cutting, (in areas with heavy vegetation with evidence of shock-sensitive MEC on the surface).

2.4.4.1 Vegetation Removal

It is estimated that vegetation removal will be required over 95 percent of the 400 acres identified for removal of surface munitions. Vegetation removal will be conducted by mechanical means using mechanical brush clearing equipment and/or the manual vegetation clearance. USFWS biologists will be notified in advance of the areas where vegetation clearance will be conducted and if necessary will conduct a site reconnaissance of the proposed work area prior to vegetation removal activities to identify and flag any biota that may be Federally protected. Cutting trees larger than 3 inches in diameter will be prohibited unless absolutely necessary. Trees will be felled into an area that has already been surface swept for MEC.

As the first step, the UXO Technicians will inspect all areas of the grid ahead of the vegetation removal crews with the aid of handheld magnetometers. The UXO Technicians will mark any MEC or other hazards by encircling the hazard with flagging tape.

The vegetation removal will be supervised by UXO Technician III and a UXO Technician II. The laborers will use hand tools that are appropriate for the vegetation being cut, such as chain saws, power string trimmers, and machetes to cut the vegetation.

When mechanized vegetation removal methods are selected an initial cut may be made prior to the surface sweep for MEC. Vegetation will be cut to height no lower than 24-inches above ground level. UXO Technicians will then perform a surface sweep with the aid of handheld magnetometers. If no MEC or metallic debris is found the vegetation can be cut to within 6 to 12 inches above ground level.

All cut vegetation will either be accumulated on-site and mulched or mulched in place. A typical method of vegetation disposal is chipping the vegetation into mulch, which is then spread over the cleared area. Brush clearance will be accomplished with gas-powered string trimmers with saw blade attachments, a tractor equipped with a bush hog mower, or other mechanical brush clearing equipment suitable for the vegetation type and potential explosive hazard. The brush will be cut to a height of no greater than 6 inches above ground surface to eliminate interference with MEC detection or survey activities.

Trees will be trimmed or removed on a case-by-case basis and only as required to accomplish the project tasks. If removal is required, the tree will be cut using chain saws or other mechanized equipment. The tree will be sectioned, if necessary, to remove it from the immediate area, so it does not interfere with MEC detection or survey activities.

2.4.4.2 MEC Investigation Operations and Removal Actions

All removal activities will be monitored by the appropriate UXO personnel described in this section.

A magnetometer assisted visual survey will be performed to locate all surface MEC for 100 percent of the project area (400 acres). All metallic items present at ground surface or partially exposed at the surface will be removed.

Magnetometer sweeps will be employed (mag and flag) for identification and clearance of all metallic items at the surface. UXO technicians will work individual search lanes approximately 3 to 5 feet wide and will search each lane using a hand held magnetometer (e.g., Schonstedt Model GA-52Cx). UXO technicians will start at one end of each lane and move forward toward the opposing base line. During the forward movement the technician will move the magnetometer back and forth from one side of the lane to the other. Both forward movement and the swing of the magnetometer will be performed at a pace, which ensures the entire lane is searched and that the instrument is able to appropriately respond to anomalies. Whenever a metallic surface object is encountered the technician will halt and investigate the anomaly real-time. Throughout this operation the UXO Technician III will closely monitor individual performance to ensure these procedures are being performed with due diligence and attention to detail.

This will achieve the objective of minimizing explosive hazards due to surface MEC. UXO teams conducting the surface clearance may use handheld magnetometers to locate smaller items. Munitions items that are safe to move will be removed by hand. MEC items which are safe to move may be consolidated for disposal/demilitarization within a grid, or several adjacent grids.

MEC items that are not safe to move will be clearly marked and all information will be gathered for the item as described in Section 2.9.4. Additionally, the accessibility, explosive hazard, location, and other factors will be assessed to determine if additional safety measures should be put in place. The item will then be demilitarized during a scheduled demolition event.

Non-MEC metallic items will be removed from the grid and will be consolidated on-site in a designated and established holding area. These metallic items will be thoroughly screened for MEC. Large items, such as target vehicles, will require additional screening for environmental pollutants (petroleum products, coolants, batteries, etc.). These items may also require onsite disassembly to facilitate removal.

2.5 MEC Procedures

Information about the MEC item will be recorded in the field using handheld GPS/PDA unit or fill-in-the-blank forms. All information will be exported to the project GIS database. Section 2.9 discusses the data collection procedure and information that will be collected for munitions items.

2.5.1 MEC Safety

In general, a projectile containing a Base Detonating (BD) fuze is to be considered armed if the projectile has been fired.

Arming wires and pop-out pins on unarmed fuzes should be secured by taping in place prior to movement.

Do not rely on the color-coding of MEC for positive identification.

Avoid the area in front of MEC items until it can be determined the item does not contain a shaped charge. The explosive jet can be fatal at great distances forward of the longitudinal

axis of the item. Assume any shaped charge munitions to contain a piezoelectric (PZ) fuze until the fuzing is positively identified. A PZ fuze is extremely sensitive, can function at the slightest physical change, and may remain hazardous for an indefinite period of time.

Examine all projectile rotating bands for fired/unfired condition. Also examine projectiles for the presence/absence of an unfired tracer.

Assume practice/training MEC contains a live charge until it can be determined otherwise. Expended pyrotechnic/practice devices may contain red/white phosphorus (WP) residue. Due to incomplete combustion, phosphorus may be present and re-ignite spontaneously if the crust is broken and the contents exposed to air (USACE, August 27, 2004). Additionally, red phosphorous is sensitive to shock/friction.

Do not approach smoking WP MEC. Burning WP may detonate the burster or dispersal explosive charge at any time.

2.5.2 MEC Identification

The UXO Technician will carefully remove enough soil, without disturbing the MEC, to facilitate positive identification or to obtain its identification features. UXO Technicians will make every effort to identify MEC through visual examination of the item for markings and other identifying features such as shape, size, and external fittings.

Items will not be moved during the inspection/identification until the fuze condition can be ascertained. If the condition is questionable, consider the fuze to be armed. The fuze is considered the most hazardous component of a UXO, regardless of type or condition. The SUXOS make final determination of identification of the item and the disposition of the item prior to implementing any disposal operations.

2.5.3 MEC Transportation

Transportation of MEC may be a consideration if safe to do and there is a compelling reason. Guidelines to determine whether to transport and procedures for transport are discussed below.

Determination to Transport MEC. Recovered military munitions or MEC will not be moved by personnel unless it is safe to do so. Movement of MEC by hand is authorized only after positive identification and a determination by the UXO Technician III and either the SUXOS or UXOSO that the MEC is safe to move. A conservative approach to MEC transportation will be taken and only considered when the item is positively identified as safe to move.

Procedures for Transportation of MEC. If onsite movement of MEC for disposal or venting is approved, move the MEC in the position found. Movement over short distances for onsite consolidation will be done by hand-carrying the MEC in the position found.

Movement of greater distances (e.g., to another grid for disposal or venting) may be done in a specially-equipped pickup truck. The truck must have the appropriate placards and a non-sparking bed liner and tie-down points. The MEC will be stabilized with sandbags or placed in a wooden box filled with sand and securely tied down. The driver of the transport vehicle will be followed by another similar vehicle and driver to assist him in loading and unloading the MEC, and in the event of mechanical trouble.

2.5.4 MEC Safe Holding Areas

Depending on condition and quantity of MEC encountered, one of the two courses of action will be taken:

- MEC left in place pending disposal.
- MEC transported to on-site consolidation point pending disposal.

MEC items left in place pending disposal will have geographic coordinates and item information gathered. The specific location of the item will be evaluated to determine any security or access concerns. Finally, the next planned demolition event for the site will be considered to determine if additional measures will be necessary to maintain control/security of the item. Additionally, activities that may result in increased trespassing or attempts to access the work areas will be evaluated to determine if additional measures should be taken to discourage access, prevent access, or minimize potential encounters with UXO. USFWS, USEPA, and PREQB will be notified if the site personnel are made aware of the possibility of increased trespassing, so they can provide notification to the appropriate enforcement agencies for both waterway access and land access. A designated area will be established on-site for collection of Material Potentially Presenting an Explosive Hazard (MPPEH).

2.5.5 Procedures When MEC Cannot be Destroyed Onsite or Cannot be Identified

MEC items encountered at the surface will be destroyed onsite. This will be accomplished through blow-in-place (BIP) or in-grid consolidation shots. Considering the remote location of the work site it is unlikely an MEC item will be encountered which cannot be safely destroyed on-site. However, in the event one or more MEC items are encountered which cannot be destroyed on-site, a suitable treatment site will be located at one of the nearby MRSs. The substantive requirements of current RCRA permits will be met for conducting consolidated demolition shots. The geographic coordinates for all consolidated shot locations will be recorded.

Military munitions will not be moved by any project personnel unless safe to do so. Movement of military munitions by hand is authorized only after positive identification and the determination is made by the UXO Technician III and SUXOS that the military munition is unarmed and safe to be moved.

Unidentified military munitions will not be handled or moved for the purpose of identification. All available data will be collected for the unknown MEC item (dimensions, external features, markings, color-code, etc.) and photos will be taken.

Assistance in identifying unknown UXO and MEC is available from the U.S. Army's Corps of Engineers (USACE) Military Munitions Center of Excellence and US Navy's Explosive Ordnance Disposal (EOD) Technology Center. The contact information for the support centers are given in Appendix A.

2.5.6 Recovered Chemical Warfare Materiel

Recovered Chemical Warfare Materiel (RCWM) is not expected to be encountered at the VNTR based on range usage archival searches and previous investigations. If suspected RCWM is encountered the following procedures will be followed:

- Person discovering suspected RCWM will immediately notify the Senior UXO Supervisor (SUXOS).
- SUXOS will immediately direct the work team to stop work and evacuate the site in an upwind direction. The initial exclusion zone (EZ) for RCWM is 450 ft upwind per Field Manual (FM)-9-15 (U.S. Army, 1996).
- SUXOS should note the location of the suspected RCWM to help with its identification and reacquisition.
- SUXOS will designate a minimum of two UXO-qualified individuals to position themselves upwind as far as possible to prevent unauthorized personnel from accidental exposure.
- SUXOS will immediately contact the NAVFAC RPM and local Department of Interior (DoI) U.S. Fish and Wildlife (USFWS) representatives to request military assistance.

Note: Assistance for RCWM will be requested through the US Army's 52d Ordnance Group at Fort Gillem, GA (404) 469-3333.

- SUXOS will account for all personnel and notify the Title II Services Contractor Project Manager.
- SUXOS will ensure the area is secured until relieved by proper authorities. The SUXOS will direct Title II Services Contractor personnel to support response units as appropriate.
- USEPA Region II, PREQB, and NOSSA will be notified if RCWM is discovered during removal action operations. The contact information for these agencies is given in Appendix A.

Before work resumes, site plans will be reviewed for adequacy in consideration of this newly discovered hazard.

There is documented use of 25mm depleted uranium (DU) projectiles during a one time event, where approximately 250 to 300 rounds were fired in the vicinity of the "convoy target" located east of the "mock runway", of the rounds fired approximately on half were recovered. The area fired upon is outside of the TCRA area; however, daily safety briefs will include addressing identification of DU and safety precautions to be used in the case DU rounds are identified. The primary procedure for addressing discovered DU rounds will be to evacuate the area by moving upwind greater than 100 meters, notify the SUXOS and UXOSO immediately, and contact the EOD Technical Support Center (TSC) at NAVEODTECHDIV for support.

The following equipment and personal protective equipment (as per U.S. Army, Industrial Operations Command, Pamphlet 700-48) will be available on-site in the case that UXO personnel are directed to remove and secure the DU to maintain the work schedule: coveralls, leather gloves, nitrile gloves, protective goggles, eye wash, hand cleanser, plastic bags (4 mil), metal container (30 gal, 55 gal, or ammunition box, swabs, tape to seal bags, marking pens, labels, and Radiac meter AN VDR2 6665-01-222-1425 (or similar). Direct surface or swab measurements with the Radiac meter can be performed if directed by support center.

2.5.7 MEC Operations in Populated/Sensitive Areas

Due to the remote location of the work site, no operations will be conducted near populated areas.

2.5.8 Demolition Procedures

Prior to carrying out demolition activities, the U.S. Coast Guard and Federal Aviation administration will be contacted and the appropriate notices made for watercraft and aircraft safety (e.g., notice to mariners and notice to airmen). Additionally the following will be notified prior to demolition activities; NAVFAC Atlantic, Title II Services Contractor, USEPA Region II, PREQB, USFWS, and the Municipality of Vieques (MOV). The contact information for these agencies are given in Appendix A.

During demolition activities, the SUXOS will have overall control of the Site. An EZ will be established around the demolition site according to the Explosive Operations Site Approval and Explosives Safety Submission. Only the SUXOS, UXO Team, and UXO-qualified safety personnel will be allowed within the EZ once the disposal operations have begun. The UXOSO will ensure safe work practices are observed, and the UXO Technician III will perform the necessary steps to safely dispose of the MEC. The following general procedures will be followed for all disposals by detonation:

- The UXO Team, comprised of the UXO Technician III and a UXO Technician II, will inspect the location, condition, and net explosive weight (NEW) of the MEC selected for disposal.
- The UXO Technician III will ensure that permission to detonate explosives has been obtained from the SUXOS and coordinated with the appropriate outside agencies.
- It is the responsibility of the SUXOS to schedule the detonations and to ensure that all project personnel are accounted for before disposal operations begin.
- The UXO Team will then prepare enough explosive charges to perform the planned detonations. The transportation vehicle will then be loaded with the properly containerized explosives and initiators, and other equipment required.
- Initiators will always be transported in a separate container from the main-charge explosives.
- A minimum separation distance of 25 feet will be observed for initiators and main-charge explosives while at the disposal site.
- If several MEC items are located in close proximity to each other, a mainline/branchline shot may be used to destroy these MEC simultaneously. Ensure the total NEW of the MEC to be destroyed does not increase the EZ minimum separation distance.
- All detonations will be dual-primed. The firing wire and initiators will be tested for continuity and the UXO Technician III will observe the UXO Technician II position the explosive charge against the MEC. The disposal shot may be tamped, however, initiators will never be buried.

- The initiators will then be connected to the firing wire and secured to the end of the detonating cord or placed into the main charge.
- The UXO Technician III will then inspect the disposal shot and return to the safe firing point.
- Prior to initiation, the UXO Technician III will ensure that guards are stationed at the roadblocks, scan the EZ for personnel, sound three distinct blasts on an air or vehicle horn, and then scan the area again and initiate the demolition charge if all is clear.
- In the event of a misfire, a 30-minute wait time for electric misfires or a 60-minute wait time for non-electric misfires will be observed. Then a new dual-primed initiator will be prepared and used to initiate the charges.
- All waterways, roadways, and other access routes will be monitored for non-essential personnel during all phases of demolition operations.

2.5.9 Post-Demolition Operations

After successful initiation of the explosive charge, the UXO Team will conduct an inspection of the disposal site and surrounding area to ensure complete destruction of the MEC. After verifying no more detonations will be required, an "all clear" notification will be issued.

The UXO Team will collect for disposal all large MEC fragments and other debris, and generally clean and restore the area.

2.6 Engineering Controls

Due to the remote location of the work site the need for engineering controls is not anticipated.

2.7 Management of Material Potentially Presenting an Explosive Hazard (MPPEH)

The procedures for managing MPPEH and munitions debris (MD) are given in Attachment 2-1, which follows this chapter.

2.8 Field Documentation

Field documentation will be performed during the removal action. All observations and measurements of sites and any associated items collected during the removal action will be recorded digitally in the field, through the use of notebook computers, digital cameras, or video cameras, or recorded in the appropriate hard copy form such as log books or investigation forms. All investigation data, whether recorded digitally or by hand, will be given to the on-site data manager as soon as possible. After the on-site data manager has created backup and management copies of all the information, the data will be given to the Project QC staff to conduct checks on accuracy and methodology.

2.9 Data Management

2.9.1 Data Collection and Processing

Data will be collected from the field, processed, and used to generate project status reports and information that will be used for the project report and a subsequent risk assessment and feasibility study, if needed.

Data collected during the site clearance will consist primarily of field observations and measurements of the munitions items found. This data will be recorded in the field either digitally on field computers or written (backup) on data forms. Photographs of munitions items will be collected as deemed necessary (e.g., single photographs of like items may be taken). At a minimum the data parameters listed on Form 2-1 will be collected.

2.9.2 Database Management and Integration with GIS

The objective of data management plan is to integrate all related project data into a single, comprehensive project database. The database will store and manage tabular data, geo-referenced map information, and photographic images. Tabular data will consist of location data and data describing munitions items (at a minimum the data parameters given on Form 2-1 will be recorded). Geo-referenced map information will include existing maps of the study area, survey control information. Photographic images will include electronic photographs of items recovered by UXO personnel, photographs of known ordnance types, and images of the Site or physical features within the Site.

The field data will be entered from the electronic data collectors and electronic data files generated on a daily basis. Database queries and reports will be written to verify data loading, perform data QC functions, map weekly progress, and provide investigators with access to the data.

Verified data will be uploaded into the project database and made accessible within the GIS Data Management System.

2.9.3 Military Munitions related Items Identification

Military munitions related items found during surface clearance activities will be assigned unique identification numbers at the time of discovery by the field team. The munitions item IDs will be associated with the 6 digit grid ID and will be formatted as follows:

A1A1A1-0001, where the first 6 digits are the 30 meter grid ID and the last four numbers will be consecutive numbers starting with 0001 and will number items sequentially. These items are normally surface finds that are not associated with subsurface geophysical anomalies.

2.9.4 MEC Data Records

An Investigation Data Form (Form 2-1) will be maintained by the SUXOS for all recovered items. If more than one UXO Team is operating on the project site, then each UXO Supervisor shall provide this information to the SUXOS at the close of each work day, or when possible for remote operations. Project Team QC personnel will perform QC evaluations as described in the QC section of this work plan (Section 10) and will provide forms to data management personnel for entry into the project database. All records, forms, and logs resulting from the field investigation will become part of the permanent project files upon completion of field activities.

2.9.5 Record Keeping/Accountability

The SUXOS has overall responsibility for the accountability of all recovered MEC material and government or commercially procured explosive demolition materials. The SUXOS will maintain an MEC Acquisition and Accountability Log (Form 2-3) that records the type, quantity, and condition of MEC from discovery to disposal. He/she will also maintain the Scrap Residue Certification Form (Form 2-2), which certifies when MEC-related materials are explosively safe.

2.10 Site Safety and Communications

Safety is the primary concern during efforts to locate and dispose of MEC. All personnel engaged in these efforts will adhere to the SSHP and any additional safety requirements. Personnel will also comply with guidelines provided in DoD 4145.26-N, Contractor Explosive Safety for Ammunition and Explosives. The health and safety plan is included as Appendix A.

In the event that sealed drums, contaminated soils, or other suspect materials or conditions are encountered during the removal action that would indicate a potential health or safety hazard, work efforts will temporarily cease pending an evaluation by the SUXOS and UXOSO. Operations will continue only when it has been determined it is safe to proceed.

All health and safety issues will be communicated to both the removal action contractor and Title II Services Contractor UXOSO. The appropriate actions for health and safety issues will be determined and the UXOSOs will communicate the information to all site personnel.

Hand-held radios will be used for any required communications between the UXO Teams and project command center/project office. The project office will relay all required communication with other station activities using established radio links or telephones (when available) as a secondary means of communication.

In the event that a suspected MEC item is discovered on-site, but outside the designated area of investigation, UXO personnel will respond to the site and examine the suspect item to confirm whether it is MEC. If the item is MEC, then notification will be made to the SUXOS (if

not already involved), the PM, and the Navy RPM to coordinate the necessary response to the item. Upon request from installation and program management personnel, the item will be addressed in accordance with the MEC procedures presented in this document. Recommendations and identification information given for the item will be recorded in the Site logbook.

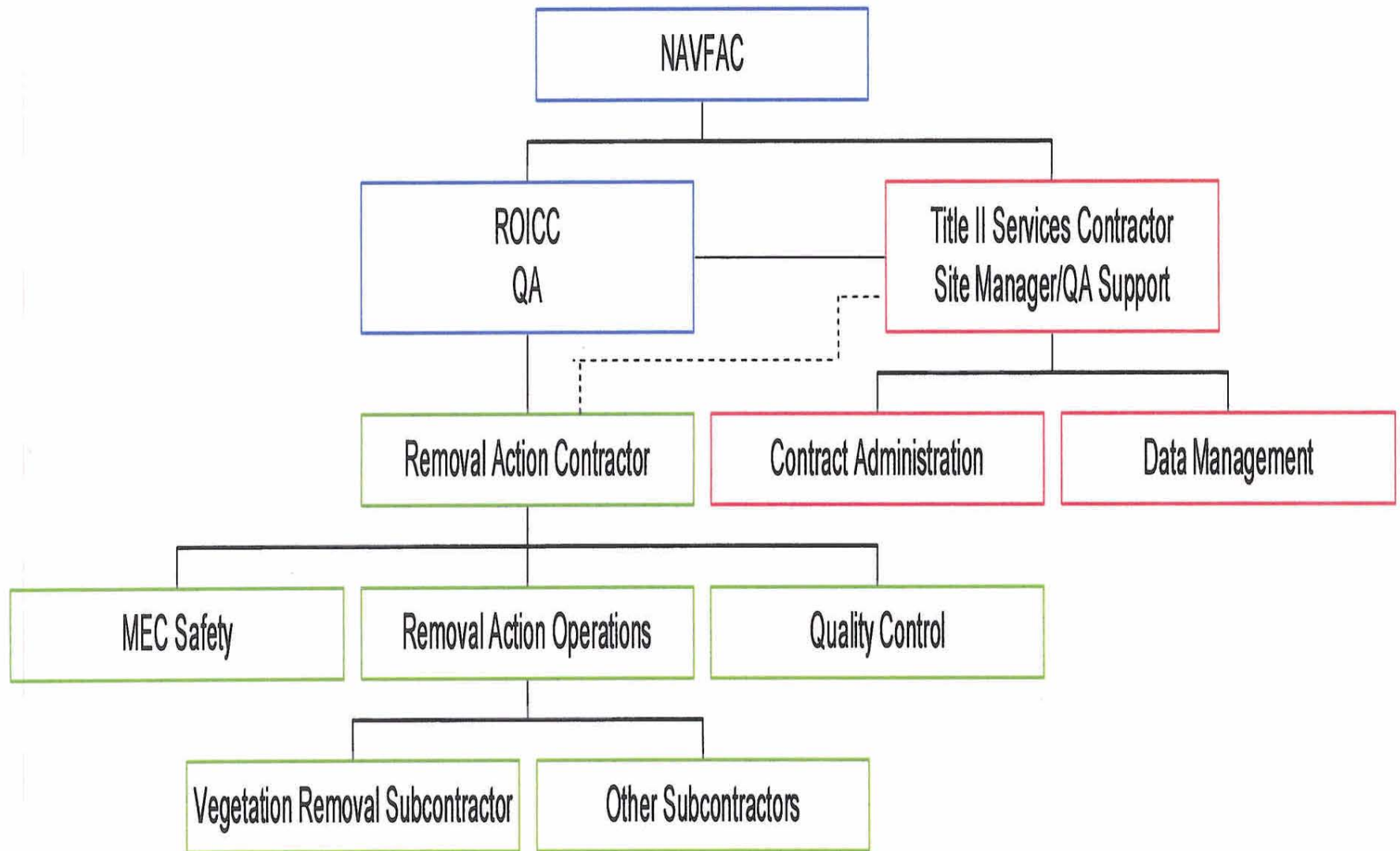


Figure 2-1
TCRA Management, Contractor, and
Subcontractor Organizational Chart
Vieques, Puerto Rico

Materials that Presents a Potential Explosive Hazard (MPPEH)/Munitions Debris (MD)

Collection and Inspection Procedures

During removal operations, UXO Technicians will encounter the following types of metallic contamination: MEC items; MPPEH/munitions debris (MD) that is contaminated with explosives or other hazardous materials; nonhazardous ordnance-related scrap metal; and general metallic debris. Because the metal scrap recovered will ultimately be disposed of off-site, it is imperative that procedures be established to preclude live ordnance or hazardous materials from becoming intermingled with nonhazardous metal scrap. Attachment 2-1 gives the procedures for addressing MPPEH.

Current and past practices have only required the inspection of MPPEH/MD and a certification by a qualified EOD/UXO technician that it is safe to the best of their knowledge. There are several pitfalls with this approach, depending on the type of ordnance being inspected. The following paragraphs provide guidance for avoiding these pitfalls.

References:

DoD 4160.21-M	<i>Department of Defense Reutilization and Marketing Manual</i>
DoD 4160.21-M-1	<i>Department of Defense Demilitarization Manual</i>
TB 700-4	<i>Department of the Army Technical Bulletin - Decontamination of Facilities and Equipment</i>

Collection Procedures

A systematic approach for collecting and inspecting metal scrap will be used. The approach is designed to ensure that the materials undergo a continual evaluation and inspection process from the time acquired until finally removed from the site.

At the operating site, two scrap metal containers will be pre-positioned. One container will be marked "Non-MEC Scrap Metal" and will be used to collect general metal debris. The other container will be marked "MD-Related Scrap Metal" and will be used to collect nonhazardous ordnance-related scrap metal (i.e., metal components that do not contain any explosives or other hazardous materials).

Collection procedures begin at the time the metal item is discovered by the UXO Technician. At this point the UXO Technician makes a preliminary determination as to the classification of the item. If the item is identified as non-ordnance-related scrap, it is placed in a temporary non-MEC/MPPEH scrap accumulation point located within the current operating grid. If the item is identified as MPPEH/MD, it is placed in a temporary MPPEH/MD accumulation point. Again, this point is located within the current operating grid.

Upon completion of operations within a grid, the UXO Supervisor for the team that cleared the grid will inspect each of the scrap piles and direct movement of the scrap into the appropriate site collection container. To preclude migration of the material from one pile to the other during movement to the scrap containers, each pile will be moved as a distinct and separate vehicle load.

Removal of Scrap Metal/Range Residue

An UXO Team (as described in Section 2.3.1) will collect the scrap piles deposited at the grid corner markers by the UXO Clearance Team and will perform an inspection to confirm that segregation of the MPPEH/MD has been done correctly and that no live MEC has been placed in the MPPEH/MD pile. The MPPEH/MD will be inspected and divided into two groups: 1) MPPEH requiring further demilitarization; and 2) MD that does not require further demilitarization. Figure 2-2 is a Logic Diagram for the Collection and Disposition of MPPEH/MD Scrap.

Segregation of Scrap Metal/Range Residue

For purposes of disposal, MPPEH/MD shall be segregated and defined as either Group 1a, Group 1b, or Group 2.

Group 1, Scrap Metal/Range Residue

Group 1 includes property that previously contained explosives or that does not contain items of a dangerous nature and can be certified inert and/or free of explosives or other dangerous materials. Group 1 includes targets, certain expended ordnance, etc.

Group 1a, Scrap Metal/Range Residue

Group 1a includes firing-range-expended small arms cartridges and inert metals gleaned from range cleanup. Metals gleaned include material for which the only use is for its basic material content (clean shrapnel, target metal, etc.) and does not include material with any residual utility or capability or that is considered to be munitions list items (MLI) or CCLI. Such material is eligible under the Resource Recovery and Recycling Program for disposition by a Qualified Recycling Program (QRP) in accordance with DoD 7514.1, Pollution Prevention. DoD Components may exercise direct sale authority for firing-range-expended small arms cartridge cases provided that they are crushed, shredded, or otherwise destroyed prior to release from DoD control.

Group 1b, Scrap Metal/Range Residue

Group 1b includes any certifiable material or item not meeting the criteria in 1a above. A determination shall be made as to whether the material or item requires demilitarization. Damage sustained does not necessarily constitute demilitarization. Destruction shall, at a minimum, satisfy the provisions of DoD 4160.21-M-1. This material is not eligible for a QRP.

Group 2, Scrap Metal/Range Residue

Group 2 includes inherently dangerous items that may potentially contain munitions residue and cannot be certified as inert, such as practice bombs (duds, MEC, BDU-33, MK-106, etc.)

Disposition of Munitions List Items (MLI)

Demilitarization should be accomplished by the most cost-effective method consistent with adequate security and surveillance, as economically as practical in accordance with existing environmental standards and safety and operational regulations, to the point of assuring freedom from explosives, toxic or incendiary materials, smoke content, or design hazards by one of the following methods:

- a. By a sales contractor as a condition of sale. Unless otherwise authorized, property to be demilitarized in accordance with DoD 4160.21-M-1 must be demilitarized prior to transfer of title to a purchaser.
- b. By the DRMO, generating activity, designated Military Service/Defense Agency, or contractor personnel (qualified UXO personnel).
- c. Under a service/performance contract.

Assignment of Demilitarization Codes

The proper procedure requires that MPPEH/MD scrap be assigned a demilitarization code; that code determines the type of processing required. For almost all MPPEH/MD scrap, the assigned code should be "A." Assignment of this code is the responsibility of the generating activity. The contractor and MEC expert will assist in determining the demilitarization code to be assigned and the method and degree of demilitarization required.

Definition of Demilitarization Code G:

"G" MLI -- Demilitarization required - AEDA, Demilitarization, and if required, declassification and/or removal of sensitive markings or information will be accomplished prior to physical transfer to a DRMO. This code will be used for all ADEA items, including those which also require declassification and/or removal of sensitive marking or information. [When in doubt, assign Demilitarization Code "G" for all recovered ORS.]

Demilitarization Requirements

Demilitarization and decontamination of MPPEH/MD scrap are based on a system that assigns decontamination levels commensurate with the post-treatment use. For metal that is being released to the public as recyclable, 5X is the acceptable degree of decontamination.

Past practices for recovery and certification of MPPEH/MD scrap from range maintenance contracts, and removal actions have improperly certified MPPEH/MD scrap as safe for turn-in to DRMO for recycling based on inspection and certification by UXO/EOD technicians. In most cases this achieves a 3X level of decontamination *de facto*. This is not sufficient for resale to the public. Three X's indicate that MPPEH/MD scrap that have been examined and decontaminated by approved procedures; that no surface contamination remains, but significant amounts (enough to present an explosive safety hazard) may remain in less obvious places. Items decontaminated to this degree cannot be furnished to qualified DoD or industry users or subjected directly to open-flame cutting, welding, high-temperature heating devices, or operations that generate extreme heat (such as drilling and machining) to ignite residual contamination. Items decontaminated to the 3X level are safe for routine investigation, examination, and transport, but not for sale or use by the general

public. Newly implemented certification procedures require two signatures for certification, of which only one signature may be from a government contractor (U.S. Army, Industrial Operation Command, Pamphlet 385-1).

The only acceptable way to get to 5X decontamination is by partial or complete removal, neutralization, or destruction of explosives/explosive residue by flashing, steaming, neutralization, or other approved desensitizing method. This is often expensive and nullifies the value of the scrap. However, to leave MPPEH/MD scrap on a range site increases the possibility of residues such as RDX, HBX, and TNT entering the groundwater and causing a more expensive problem.

Technical instructions issued by the Defense agency or military service having procurement responsibility for the item involved and/or instructions provided through the DoD Demilitarization Bulletin Board System will determine and identify the method of demilitarization and the degree to which additional demilitarization is necessary to meet the requirements in their respective areas. For additional information, contact the following:

- a. For ammunition procured by the Department of the Army, technical instructions relating to ballistic missiles, and large rockets will be furnished by the Commander, U.S. Army Aviation and Missile Command (AMCOM), Attn: AMSAM-DSA-WO, Redstone Arsenal, AL 35898-5239.
- b. For conventional, chemical, and all other types of ammunition procured by the army except lethal chemical agents and waste munitions, technical instructions will be provided by the U.S. Army Industrial Operations Command, Attn: AMSIO-SMK, Rock Island, IL 61299-6000.
- c. For lethal chemical agents, including vesicants and nerve agents and their carriers, technical instructions will be furnished by the U.S. Army Armament Material Readiness Command Program Manager for the Demilitarization of Chemical Material, Edgewood Arsenal, Aberdeen Proving Ground, Maryland 21010.
- d. For ammunition procured by the Department of the Navy, technical instructions will be issued by the Commander, Naval Sea Systems Command, or by the Commander Naval Air Systems Command, Department of the Navy, Washington, D.C.
- e. For ammunition procured by the Department of the Air Force, technical instructions will be issued by the Engineering and Reliability Branch (MMWR), Ogden Air Logistics Center, Ogden, UT 84056-5609.

The following paragraphs provide guidance for the method and degree of required demilitarization for most types of MPPEH items.

Category III. Ammunition - Method and Degree of Required Demilitarization

- a. **Artillery/Mortar Ammunition Components and Similar Items of All Types** including but not limited to high-explosive, practice, inert-loaded, incendiary, and smoke fillers. Remove explosive filler from projectile (wash out, burn out, etc.). Remove rotating band and deform fuze cavity threads or score or deform bourrelet or gas check band. Burn propellant unless otherwise instructed to retain for sale or other purposes. Deform fin assembly threads or fin blades. Deform cartridge cases by off-center punch-out of

primer, or split case neck, or puncture the lower sidewall with a minimum of 3/4-inch hole, or deform lower sidewall (which prevents chambering), or crush, or press. Burn out smoke mixture or detonate smoke canister.

- b. **Inert Loaded Ammunition, Projectiles, and Similar Items of All Types** loaded with inert filler to simulate service item. Remove rotating band from artillery projectiles and open the closure of the projectile body to expose the inert filler. On items without rotating bands, open the body closure to expose the inert filler and damage the closure surface to prevent reloading or resealing.

NOTE: For inert-loaded items (concrete, sand, plaster), a potential explosive safety hazard exists when the internal filler is not exposed or unconfined during burning, melting, or cutting. Heat generated from a demilitarization process can cause the filler, moisture, and air to expand and burst sealed casings, causing a mechanical explosion. For this reason, DRMOs will not accept inert-loaded items unless the internal filler is exposed and unconfined. The internal filler may be exposed by removal of the fuze well from the cavity, removal of base plates, or by puncturing/drilling holes in the casing.

- c. **Ammunition and Components Which Have Been Fired or Expended, Range Residue and Other Non-Explosive Items.** All items will be rendered free of energetic materials prior to accomplishment of demilitarization. Range residue will be processed in accordance with the Defense Material Disposition Manual, DoD 4160.21-M, Chapter 4, paragraph B.3, after all required demilitarization is accomplished.

- (1) **Artillery/Mortar Ammunition Components and Similar Items of All Types.**
Remove rotating band and deform fuze cavity threads or score or deform bourrelet or gas check band. Score practice bomb with a torch, displacing a minimum of 1 cubic inch of metal; or shear into two pieces. Deform fin assembly threads and fin blades.
- (2) **Inert Loaded Ammunition, Projectiles, and Similar Items of All Types** loaded with inert filler to simulate service item. Remove rotating band from artillery projectiles and open the enclosure of the projectile body to expose the inert filler. On items without rotating bands, open the body closure to expose the inert filler and damage the closure surface to prevent relocating or resealing.

NOTE: For inert-loaded items (concrete, sand, plaster) a potential explosive safety hazard exists when the internal filler is not exposed or unconfined during burning, melting, or cutting. Heat generated from a demilitarization process can cause the filler, moisture, and air to expand and burst sealed casings, causing a mechanical explosion. For this reason, DRMOs will not accept inert-loaded items unless the internal filler is exposed and unconfined. The internal filler may be exposed by removal of the fuze well from the cavity, removal of base plates, or puncturing/drilling holes in the casing.

- (3) **Other Non-explosive Filled Items** that perform a major function essential to the basic mission of the end item. Cut, crush, or process through a deactivation furnace. Burn or cut cartridge case lines and propelling charge bags. Cut, burn, or

crush aircraft and ground signal cases. Crush or detonate piezoelectric (lucky) elements.

Category V. Military Explosives, Solid and Liquid Propellants, Bombs, Mines, Incendiary Agents, and their Constituents - Method and Degree of Required Demilitarization

- a. **Artillery/Mortar Ammunition Components and Similar Items of All Types** including but not limited to high-explosive, practice, inert-loaded, incendiary, and smoke-fillers. Remove explosive filler from projectile (wash out, burn out, etc.). Remove rotating band and deform fuze cavity threads or score or deform bourrelet or gas check band. Burn propellant unless otherwise instructed to retain for sale or other purposes. Deform fin assembly threads or fin blades. Deform cartridge cases by off-center punch-out of primer, or split case neck, or puncture the lower sidewall with a minimum $\frac{3}{4}$ -inch hole, or deform lower sidewall (which prevents chambering), or crush, or press. Burn out smoke mixture or detonate smoke canister.
- b. **Inert Loaded Projectiles, Warheads and Similar Items of All Types** loaded with inert filler to simulate service item. Remove fuze and/or spotting charge, where applicable, and burn or detonate. Remove rotating band from artillery projectiles and open the enclosure of the projectile body to expose inert filler. On items without rotating bands, open the body closure to expose the inert filler and damage the closure surface to prevent reloading or resealing.
- c. **Bombs and Similar Items of All Types**, including but not limited to high-explosive, practice, inert-loaded, incendiary and photoflash fillers, military explosive excavating devices, demolition blocks, and grenades. Demilitarization will be accomplished by removal of explosive filler in an approved manner (e.g., wash-out, burn-out, etc.) and by deforming fuze cavity threads or removing base plate by other than normal disassembly (such as sawing) or by detonation. Grenades will be demilitarized by cutting or crushing (a minimum of 75 percent compression) the grenade body after item has been defuzed and explosive removed; or by detonation.
- d. **Small Explosive Items**, including but not limited to fuzes, boosters, primers, detonators, firing devices, ignition cartridges, blasting caps, grenade cartridges, tracer assemblies, and similar components. Demilitarization can be accomplished by processing through a deactivation furnace at settings of 1150 degrees at burner end and 450 to 500 degrees at stack end; or by mutilation. Incendiary projectiles will normally be decored to expose and assist in the complete burning of the incendiary composition. Where decoring of the projectile is not necessary, processing through the deactivation furnace is adequate. Burn out 20mm HE projectiles by processing through the deactivation furnace; or detonate. Processing complete small arms ammunition cartridges, all calibers, through the deactivation furnace at controlled temperatures will result in adequate demilitarization. Fuzes and boosters can be disposed of by disassembly and cutting, drilling, or punching to deform metal parts. Explosive components generated through disassembly are to be burned or detonated. Fuzes may also be processed through a deactivation furnace as a complete item when disassembly is not feasible. For grenades, demilitarization may be accomplished by removal of explosive components by crushing, cutting, breaking, melting, burning, etc., to fully preclude their rehabilitation or further use as grenade

components. Demilitarization may also be accomplished by detonation or burning as appropriate for the particular item involved.

- e. **Rocket Motors, Warheads, Components and Similar Items of All Types**, including high-explosive, inert, loaded, practice, and smoke. Wash out or burn out rocket warhead filler and mutilate casing by crushing or cutting by torch and deforming threaded area. Disassemble and remove or burn out rocket motor propellant, cut or crush case, and deform threaded area of case. Rocket motors and warheads may also be detonated.
- f. **Mines, Anti-Personnel/Anti-Tank Explosive, Components, and Similar Items of All Types**, including high-explosive, practice, inert-loaded, and associated explosive components. Wash out or burn out filler and mutilate by crushing, cutting by torch, and deforming threaded area; or detonate. Process mine fuzes, activators, and firing devices through a deactivation furnace, burn in a cage, or detonate. Mine firing devices such as the M56 or M61 types should be crushed, cut, or burned.
- g. **Ammunition and Components That Have Been Fired or Expended, Range Residue, and Other Non-Explosive Items**. All items will be rendered free of energetic materials prior to accomplishment of demilitarization. Range residue will be processed in accordance with the Defense Material Disposition Manual, DoD 4160.21-M, Chapter 4, paragraph B.3, after all required demilitarization is accomplished.
 - 1. **Artillery/Mortar Ammunition Components and Similar Items of All Types**, including but not limited to high-explosive, practice, inert-loaded, incendiary, and smoke fillers. Remove explosive filler from projectile (wash out, burn out, etc.). Remove rotating band and deform fuze cavity threads or score or deform bourrelet or gas check band. Score practice bomb with a torch, displacing a minimum of 1 cubic inch of metal; or shear into two pieces. Deform fin assembly threads and fin blades. Deform defective cartridge cases by off-center punch-out of primer, or split case neck, or puncture the lower sidewall with a minimum $\frac{3}{4}$ -inch hole, or deform lower sidewall (which prevents chambering), or crush, or press. Burn out smoke mixture or detonate smoke canister.
 - 2. **Inert-Loaded Ammunition, Projectiles, and Similar Items of All Types** loaded with inert filler to simulate service item. Remove rotating band from artillery projectiles and open the enclosure of the projectile body to expose the inert filler. On items without rotating bands, open the body closure to expose the inert filler and damage the closure surface to prevent relocating or resealing. NOTE: For inert-loaded items (concrete, sand, plaster), a potential explosive safety hazard exists when the internal filler is not exposed or unconfined during burning, melting, or cutting. Heat generated from a demilitarization process can cause the filler, moisture, and air to expand and burst sealed casings. For this reason, DRMOs will not accept inert-loaded items unless the internal filler is exposed and unconfined. The internal filler may be exposed by removal of the fuze well from the cavity, removal of base plates, or by puncturing/drilling holes in the casing.
 - 3. **Bombs and Similar Items of All Types**, including but not limited to high-explosive, practice, inert-loaded, incendiary and photoflash fillers, military explosive excavating devices, demolition blocks, and grenades. Demilitarization will be

accomplished by deforming fuze cavity threads or removing base plate by other than normal disassembly (such as sawing); or by detonation. Grenades will be demilitarized by cutting or crushing (a minimum of 75 percent compression) the grenade body after item has been defuzed and explosive removed; or by detonation.

4. **Rocket Motors, Warheads, Components, and Similar Items of All Types**, including high-explosive, inert-loaded, practice, and smoke. Demilitarize casing by crushing or cutting by torch, or by deforming threaded area. Cut, crush case, or deform threaded area of rocket motor cases.
5. **Mines, Anti-Personnel/Anti-Tank, and Similar Items of All Types**, including high-explosive, practice, inert-loaded, and associated components. Demilitarize casing by crushing, or by cutting with a torch, and deforming threaded area; or detonate. Mine firing devices such as the M56 or M61 types should be crushed, cut, or burned.

h. Instructions For Specific Ordnance Items:

1. BDU-50 Practice Bomb:

- (a) Each bomb must be inspected by qualified EOD/UXO personnel to ensure that the bomb is a BDU-50 and that the bomb is expended. If the EOD/UXO personnel cannot verify both fuze wells, or absence thereof, it must be opened remotely by detonation.
- (b) A ¼-inch hole will be punched in each of the two spanner wrench receptacles, fracturing the metal to a depth in excess of 1/10 inch into the concrete filler material.
- (c) A ¼-inch punch will be used to further damage the threads of the nose plate, ensuring that the plate cannot be removed and replaced.
- (d) Fins will be deformed or broken, and paint will then be used to place a mark of contrasting color on the bomb or near the nose.

Venting of MPPEH Scrap

Prior and current practices have taken this to mean that if the MPPEH item is intact and resembles a piece of military ordnance, such as a 105mm HEAT (Practice) projectile, it should have a hole punched through the side to expose the filler as non-explosive. This is typically accomplished through the use of a shaped-charge attack, or vented using remotely operated water-jet cutting technology. The explosively created hole exposes the filler and disfigures the projectile so that it cannot be used again. For a 105mm HEAT (Practice) bomb, this approach is sufficient because the projectile never contained any explosives or energetic material used as a spotting charge. For a MK- 82 LDGP Bomb (Practice), this approach may not be sufficient because the bomb can contain various types of explosively activated spotting charges that have the capability to cause injury or death if exposed to the right elements such as flame from a cutting torch. And there is always the possibility that a shaped-charge attack may punch a hole in an explosive ordnance item, exposing the filler but not causing a detonation. Because some explosive fillers look like inert fillers, the possibility for misidentification and improper certification is real.

MPPEH known or suspected to be inert (filled with an inert substance to simulate the weight of an explosive filler) will be explosively vented with conical-shaped charges or vented using a remotely operated water-jet cutter. For the purpose of determining the fragmentation hazard area for venting, it will be assumed that the MPPEH has an explosive filler and that a high-order detonation will occur. Venting will be considered successful when the inert filler is exposed. The vented inert ordnance item can be treated and disposed of as scrap after the venting and demilitarization process is complete.

Certification/Disposal of Scrap Metal

The contractor will ensure that the quantities of demilitarized property designated for and recycled are accurate and that these quantities are readily verifiable. Recycling facilities will not accept any property unless the DD Form 1348-1A contains the demilitarization code or clear text statement of the demilitarization required. The generating activity is responsible for issuing a letter specifying who is authorized to sign the statement of inert certification. This letter will be kept in the project files and with the generating activity. It must be updated as needed. Personnel designated as authorized to sign on behalf of the contractor must have an authorization letter from the principle identified on that contractor's BATFE License.

All material generated from the firing and/or demilitarization of AEDA will be rendered **free from explosives** before being referred to a recycling facility for sale. All scrap metal generated at the site will be disposed of through an approved scrap metal dealer, and will be transferred using DD Form 1348-1A. Prior to release of the material, the Senior UXO Supervisor will physically inspect the material in the containers to ensure that they are free of dangerous items, or will conduct demilitarization operations. The Senior UXO Supervisor will sign the certificate, typed on the DD Form 1348-1A, which states:

"We certify and verify that the AEDA residue, Range Residue and/or Explosive Contaminated property listed has been 100 percent properly inspected by us and to the best of my knowledge and belief, are inert and/or free of explosives or other dangerous materials."

The certification will be verified (countersigned) by a technically qualified U.S. government representative (U.S. citizen) designated by the responsible commander/generating activity.

Scrap will be segregated into like metals (mainly steel, aluminum, and mixed metal) and placed into palletized wooden shipping boxes. Each item placed in an inert-certified box will be inspected. The boxes will be filled, the covers will be nailed on, and a lead seal will be affixed. A Statement of Inert Certification will then be attached to the box. The box can then be picked up by a local scrap yard for disposal or recycling.

Using these procedures ensures that the collected scrap metal is properly inspected and classified. Our method includes three distinct inspections, which are performed by persons of increasing levels of responsibility. The first inspection is performed at the operating grid by a qualified UXO Technician, the second is performed by the supervisor responsible for the operating grid, and the final inspection is performed by the Senior UXO Supervisor who is vested with overall responsibility.

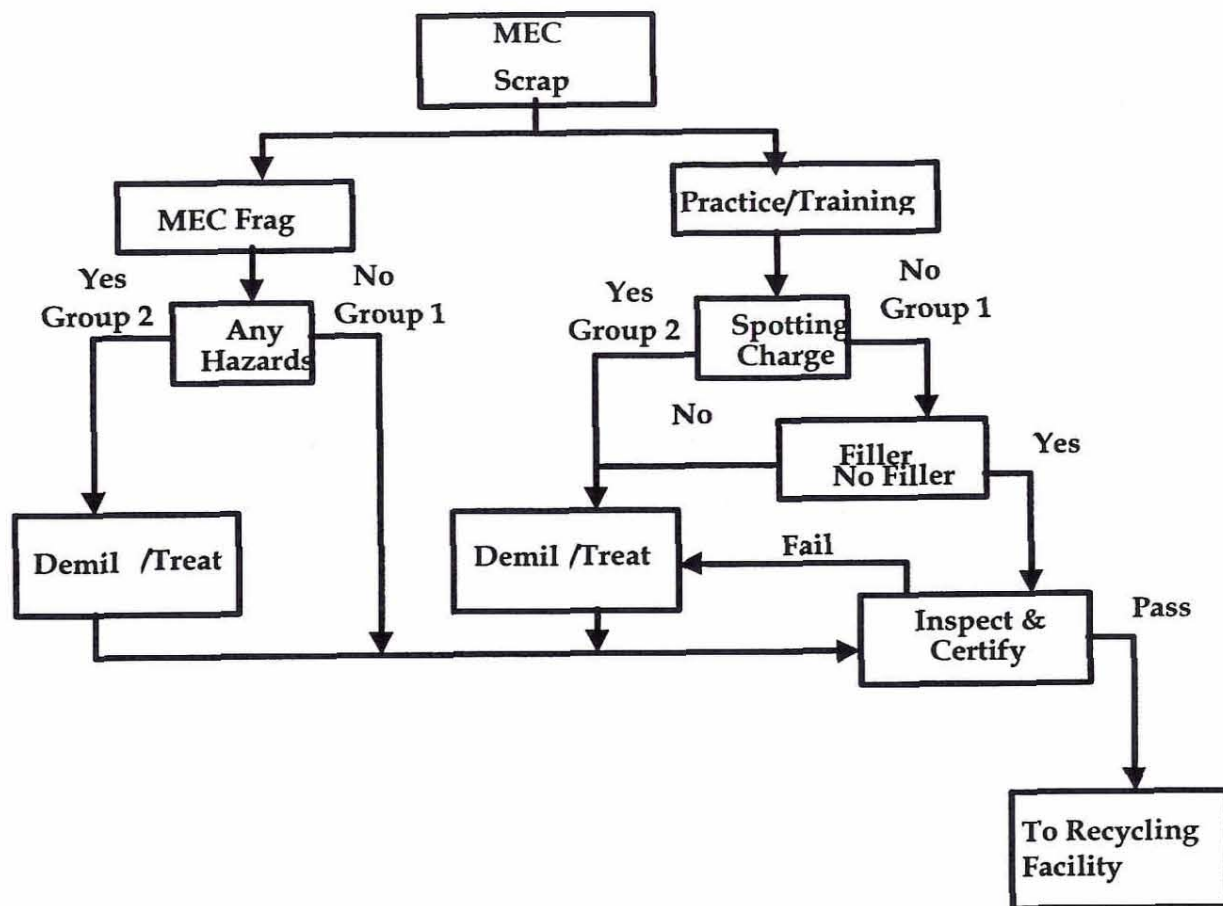


FIGURE 2-2
Logic Diagram for the Collection and Disposition of MPPEH/MD Scrap

FORM 2-1

MEC INFORMATION FORM

DATE/TIME: _____ IDENTIFICATION# (ID): _____
 LOCATION: _____

1. ITEM REMOVED FROM SITE (YES/NO)

2. WHO REMOVED THE ITEM?

Name: _____ Organization: _____

3. IF ITEM WAS REMOVED, WHERE WAS IT TAKEN? _____

4. ITEM DESTROYED ONSITE (YES/NO)

5. WHO DESTROYED ITEM?

Name: _____ Organization: _____
 Time of Detonation: _____ MEC Down Time: _____

6. MEC ITEM ENCOUNTERED:

Type	Reference Information Location*	Condition	Disposition

*Identify location where records regarding information on this item are located (e.g., field book # and date, electronic file name and location, paper form ID and location) or record parameters listed below in comments section.

- The site vegetation, topography and soil/bedrock type
- Transect locations (for Inland MRS)
- Geographic location
- MEC size
- Qualitative magnitude of geophysical sensor response for subsurface anomaly
- Orientation of item
- The condition of the MEC (whether or not expended)
- Disposal method if item is removed
- Disposal date if applicable
- Whether or not the MEC is fuzed and contains explosive filler

7. US NAVY NOTIFIED AT (TIME): _____ REP: _____

8. CH2MHILL PERSONNEL NOTIFIED AT (TIME): _____ REP: _____

9. COMMENTS (Significant events or findings): _____

CH2MHILL UXO Representative (Signature)

CH2MHILL UXO Representative (Print Name)

CHECKED BY _____

APPROVED BY _____

USE ☐ TYPEWRITER OR BALL POINT ☐ PEN
PRESS HERE
TO ASSURE LEGIBILITY ON ALL COPIES

DD FORM 1348 JUL 91 (EG) REQUISITION SYSTEM DOCUMENT (MANUAL)

DOC.		ROUT.	FSC	NIN	ADD.	QUANTITY	DATE	SERIAL	STOCK NUMBER		UNIT OF MEASURE	QUANTITY	
IDENT.	IDENT.				REMARKS				ADDRESS	TOWN	PROD.	REV.	ADJ.
SEND TO:													
RECUSTION IS FROM:													
A													
B													
C													
D													
E													
F													
G													
H													
I													
J													
K													
L													
M													
N													
O													
P													
Q													
R													
S													
T													
U													
V													
W													
X													
Y													
Z													

PREVIOUS EDITIONS MAY BE USED

Explosives Management Plan

3.1 General

This section of the Site-Specific work plan addresses specific field-level explosive management practices required to support the TCRA in the western section of the LIA. An ESS was submitted to NOSSA and DDESB and approved (December 29, 2004) as an independent document for investigation and removal of surface MEC (*Draft Final Explosives Safety Submission, Expanded Range Assessment/Site Inspection, Former VNTR, Vieques, Puerto Rico, August 2004; Draft Final Explosives Safety Submission, Expanded Range Assessment/Site Inspection, Former VNTR, Amendment 1, Vieques, Puerto Rico, March 2005*).

3.2 Licenses and Permits

The project Munitions Removal Contractor should be prepared to acquire commercial explosives from a local vendor who will deliver the materials to the project site. The UXO contractor will maintain a valid BATFE user of High Explosives permit. Explosives vendors cannot supply explosives without the required valid dealer BATFE license. A copy of this dealer license will be maintained at the project office, and upon request, will be made available to any local, state, or federal authority.

3.3 Procedures

3.3.1 Acquisition

The types and estimated quantities of explosives and their intended use during the project may be revised as work progresses, but typically the following explosives will be used during explosive disposal of MEC:

- 1,000 lbs. high-explosive donor charge such as TNT, Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazine (HMX), or binary explosives that detonate at high velocities will be used to detonate MEC.
- 100 each Jet Perforators, or similar prepackaged shaped charges will be used to explosively vent hard-cased munitions.
- 5,000 feet detonating cord will be used to construct mainline-branch line shots, to link multiple shots together, or to transmit the explosive train to the main charge explosive when the main charge is buried (tamped), underwater, or otherwise inaccessible.
- 500 each electric and/or non-electric blasting caps will be used as initiators.
- 20,000 feet NONEL (shock-tube) will be used to transmit the explosive train from the igniter to the demolition devices. Shock-tube priming of explosives offers the instantaneous action of electric detonation without the risk of accidental initiation of the

blasting cap (and the charge) by radio transmitters in the area, or by static electricity discharge. The explosion of the shock-tube is totally contained within the plastic tubing.

All explosives are expected to be purchased through commercial suppliers in Puerto Rico. Military explosives are not expected to be requested/issued for this project.

3.3.2 Initial Receipt

Explosive shipments will normally originate from the island of Puerto Rico. The mode of delivery to Vieques may vary based upon the DOT Hazard Classification of the explosives being delivered. Binary explosives, NONEL, and certain initiators may be delivered by commercial air carrier to the Vieques Airport. High explosive main charges, Jet Perforators, detonating cord, and certain initiators may be delivered by special chartered aircraft or delivered to Vieques Island via watercraft.

Regardless of delivery mode, all incoming shipments will be met by project personnel qualified to transport explosives such as the SUXOS and/or USOSO and taken directly to explosive storage magazines near OP1 (buildings 4710A and 4710B).

Explosives in unsealed boxes containing partial lots will be opened, and the contents counted. Any discrepancies between the actual type and quantity of explosives received and the shipping documentation will be noted on the shipping documentation with the signatures of both the delivery driver and the individual authorized to receive the explosives. A legible copy will be filed onsite. The authorized individual receiving the explosives will immediately inform the SUXOS of the discrepancy, who will in turn notify the Title II Services Contractor Munitions Response Manager. Project personnel will take the appropriate action as described below.

3.3.2.1 Establishment of Explosives Storage Facilities

Explosives items will be stored in accordance with its Hazard Division (HD) and the storage compatibility group criteria listed in DoD 6055.9-STD and NAVSEA OP 5 Volume 1.

Permanent explosives storage magazines are available on-site; however, if temporary explosives magazines are required, they will be Type 2 magazines as described in Section 55.206 of BATF P 5400.7, Alcohol, Tobacco, and Firearms Explosives Law and Regulations, will be used. The maximum NEW to be stored in each temporary magazine is 50 pounds. This explosives storage area will meet the requirements of:

- BATF P 5400.7 – Alcohol, Tobacco, and Firearms Explosives Laws and Regulations;
- DoD 6055.9-STD – DoD Ammunition and Explosives Safety Standards, and
- NAVSEA OP 5 Volume 1, Ammunition and Explosives Ashore: Safety Regulations for Handling, Storing, Production, Renovation, and Shipping

3.3.3 Quantity Distance

For building 4710B, storage of 3,000 pounds NEW of HD 1.1 explosives, the IBD is 1,250 ft, the PTR distance is 60 percent of the IBD, or 750 ft. For building 4710A, storage of 100 pounds NEW of HD 1.4 explosives the IBD is 75 feet and the PTR distance is 75 feet.

3.3.3.1 Physical Security

Each explosive storage magazine (buildings 4710A and 4710B) is surrounded by a chain-link security fence with a lockable gate. The magazine doors are fitted with tamper-resistant hardware which will accept a single padlock. The gate keys will be issued to the SUXOS and the magazine keys will be issued to the UXOSO. Keys will be secured in the project office when not in use.

If temporary magazines are required, locks will meet the standards for BATFE Type 2 magazines, as specified in Section 55.208(a)(4), BATFE P 5400.7. Each magazine will have two locks. The SUXOS will hold a key to one of the locks, and the UXOSO will hold the key to the other. Access to the explosives will require both individuals. Keys will be secured in the project office when not in use.

A guard will be posted at OP1 when explosives are stored in building 4710A and 4710B. The guard will verify the security of both facilities every two hours. The guard will have reliable communications to notify Fish and Wildlife Services and local law enforcement in case of emergency.

3.3.3.2 Placards

Explosive storage magazines will be clearly marked with DoD fire symbols and NFPA 704 markers. Signs stating "EXPLOSIVES" and "NO SMOKING" will be posted on the outside of the magazines.

3.3.3.3 Lightning Protection System

Buildings 4710A and 4710B have installed lightning protection systems that comply with the specification given in the *Draft Final Explosives Operations Site Approval, Former VNTR, Vieques, Puerto Rico, October 2004*.

3.3.3.4 Fire Protection

Fire extinguishers of 10 pounds and type BC will be located in the magazine area. Smoking, matches, open flames, spark producing devices, and firearms will not be permitted within 50 feet of the magazines. The area surrounding the magazines will be kept clear of all combustible materials for a distance of at least 50 feet.

3.3.3.5 Stocking Procedures

When explosives are stored onsite to meet project requirements, the containers of explosive materials are to be stored so that markings are visible. Stocks of explosive materials are to be stored so that they can easily be counted and checked upon inspection.

Except for fiberboard and other non-metal packages, containers of explosive materials are not to be unpacked or repacked inside a magazine or within 50 feet of a magazine, and must not be unpacked or repacked close to other explosive materials. Containers of explosive materials must be closed while in storage.

Tools used for opening and closing containers of explosive materials are to be of non-sparking materials, except that metal box-cutters may be used for opening fiberboard containers. A wood wedge and a fiber, rubber or wooden mallet is to be used for opening

and closing wood containers of explosive materials. Metal tools other than non-sparking transfer conveyors are not to be stored in any magazine containing explosives.

3.3.4 Transportation

This section presents the vehicle requirements and on-site transportation procedures of explosives.

3.3.4.1 On-site Transportation Procedures

Explosives will be delivered to the magazines by a licensed and permitted commercial explosives transporter. When explosives are required at the work site, the UXO team will transport the explosives in an appropriately placarded vehicle following the procedures stated in this section.

Procedures for transporting explosives from the storage facility to the demolition site include the following rules:

- The driver of any explosive-laden vehicle will ensure that the load is properly braced and that the initiators are carried separately from main charge explosives.
- The UXO Technician in charge of the explosives movement will ensure the driver and any passengers are not carrying any smoking products or flame producing devices. Smoking is strictly forbidden by all personnel involved in the handling or transportation of explosives.
- Drivers transporting explosives on roads that are not controlled by the US Government must possess a valid commercial driver's license with a hazardous materials endorsement.
- The amount of explosives issued and transported will be limited to the amount needed to perform the day's demolition operations and any quantity limitations imposed by transportation regulations.
- WP munitions will not be transported unless immersed in water, mud, or wet sand.
- If loose pyrotechnic, tracer, flare, and similar mixtures are transported, they shall be placed in #10 mineral oil or equivalent to minimize fire and explosion hazards.
- If an unfired rocket motor must be transported, it shall be positioned in such a manner as to offer the maximum protection to personnel in the event of an accident.
- If base-ejection type projectiles must be transported to a disposal area or collection point, the base will be oriented to the rear of the vehicle and the projectile secured in the event the ejection charge functions in route.
- If a UXO with exposed hazardous filler (HE, etc.) has to be moved to a disposal area, the item shall be placed in an appropriate container with packing materials to prevent migration of the hazardous filler. Padding should also be added to protect the exposed filler from heat, shock, and friction.

3.3.4.2 Vehicle Requirements

Vehicles transporting explosives on the Site will comply with the following requirements:

- Vehicles transporting explosives will be properly placarded.
- All vehicles transporting explosives will be equipped with reliable communications, a first aid kit, and two 10-pound BC fire extinguishers.
- Vehicles transporting explosives will be inspected daily when in use and the inspections will be documented in a Motor Vehicle Inspection Form (Form 3-1).
- The vehicle used to transport the explosives will have a non-sparking bed liner, and all explosive loads will be covered prior to departure.

3.3.5 Receipt Procedures

This section describes the procedures the UXO Team will use to maintain records of explosives inventories.

3.3.5.1 Inventory Control and Records Management

If storage of explosives onsite is required, an accurate running inventory of all explosives will be maintained on the Magazine Data Card. One copy of the Magazine Data Card will be kept with the specific lot of explosives, and one copy, which mirrors the original, will be kept in the field office.

At the time of explosives delivery, and at the time of explosives issue, the SUXOS will ensure all additions and subtractions from the inventory of a magazine are recorded on the Magazine Data Card. If issued explosives are not used, they will be added back in to the inventory and recorded on the Magazine Data Card.

Explosives will be tracked by lot number on the Magazine Data Card. All explosives inventory records generated will be archived by Title II Services Contractor for a period of at least 5 years in accordance with BATFE regulations.

3.3.5.2 Authorized Individuals

Written authorization for individuals who can purchase, store, or use explosives must be included in the site specific work plans.

The SUXOS will be responsible for the proper receipt of explosives from the explosives vendor. Only personnel designated in writing may conduct the receipt and initial inventory of the explosives. Individuals authorized to receive explosives will be at least a UXO Technician III.

3.3.5.3 End-User Certification

The UXO Technician III or SUXOS, as the end-user of explosives, will certify in writing that the explosives were used for their intended purpose.

3.3.5.4 Reconciling Discrepancies

In the event there is a discrepancy following daily deliveries or on-site storage between the explosives on hand and the explosives inventory recorded on the Magazine Data Card, the SUXOS will be notified. The SUXOS, together with the UXOSO, will review documentation to determine whether the discrepancy is a paperwork error or whether explosives have been lost or stolen. If it is concluded explosives are lost or stolen, the procedures listed below will be followed.

3.3.6 Inventory

If explosives are stored onsite, each Magazine Data Card will be audited weekly by project staff, such as the Title II Services Contractor PM or UXOSO, on a rotating basis. The SUXOS will ensure that the contents of each magazine are inventoried on a weekly basis and that the quantities of explosives on hand match the quantities listed in the Magazine Data Cards. During this inventory, the numbers of each item stored in the magazine will be determined by inspection and counting. Sealed containers will be left unopened and counted as full. Discrepancies discovered at any time will be handled as described in the following section.

3.3.7 Lost, Stolen, or Unauthorized Use of Explosives

If explosives are discovered to be lost, stolen, or used without authorization, the incident will be immediately reported to the SUXOS, who in turn will inform the Title II Services Contractor PM. The PM shall immediately notify the NAVFAC RMP.

The Federal licensee is required by law (27 CFR 55.30) to report the theft or loss of explosives to the BATFE within 24 hours. In the event of such an occurrence, the following procedures will be followed:

- The magazine will be secured, and the area will be sealed until the appropriate authorities complete their investigation.
- Notify the BATFE [(800) 424-9555] and the local law enforcement authorities.
- The Federal licensee is responsible for completing and forwarding BATF Form 5400.5. This form will be completed by the SUXOS, and a copy will be provided to the RPM.

3.3.8 Return of Unused Explosives

If explosives are being stored onsite and a situation arises where explosives have been issued to the Project Team MEC staff but not used during the course of the workday, the unused explosives will be returned to the magazine prior to that shift ending. All unused explosives will be returned to the magazine that they came from, and the Magazine Data Cards will be annotated.

3.3.9 Disposal of Explosives

If explosives were being stored onsite and some quantity remains at the end of the project, the Project Manager will consult with NAVFAC and contracting representative to determine the appropriate disposition. A detailed accounting of remaining explosives and an economic analysis of possible alternatives. Consideration will be given to transfer the remaining explosives to another project via a licensed and permitted commercial explosives carrier. If

economically advantageous transfer opportunities cannot be identified, the explosives will be detonated consistent with procedures contained in this work plan.

Form 3-1

MOTOR VEHICLE INSPECTION
(TRANSPORTING HAZARDOUS MATERIAL)

GBL. NO.	ORIGIN	DESTINATION
NAME OF CARRIER		
NAME OF DRIVER		
DATE AND HOUR		
INSTALLATION/ACTIVITY		
DIVER=S STATE PERMIT NO.		
MEDICAL EXAMINER=S CERTIFICATE AND DATE		

TYPE OF VEHICLE _ TRUCK Q TRUCK AND FULL TRAILER Q TRACTOR AND DOUBLE TRAILERS Q TRACTOR AND CLOSED SEMI-TRAILER Q TRACTOR AND FLAT-BED TRAILER	TRUCK NUMBER	TRAILER(S) NUMBER	SLEEPER CAB
	ORIGIN	ORIGIN	Q YES _ NO
	DESTINATION	DESTINATION	VALID LEASE
			_ YES Q NO
			I.C.C. NUMBER

*NOTE: All of the following items shall be checked on empty equipment prior to loading.
Items with an asterisk (*) shall be checked on incoming loaded equipment.*

ITEM NO.	CHECK APPROPRIATE COLUMN (See reverse side for explanatory notes)	ORIGIN		DESTINATION		REMARKS (Explain unsatisfactory items; use reverse side if necessary)
		SAT	UNSAT	SAT	UNSAT	
1.	ENGINE, BODY, CAB AND CHASSIS CLEAN					
2.	STEERING MECHANISM					
3.	HORN OPERATIVE					
4.	WINDSHIELD AND WIPERS					
5.	SPARE ELECTRIC FUSES AVAILABLE					
6.	REAR VIEW MIRRORS INSTALLED					
7.	HIGHWAY WARNING EQUIPMENT					
* 8.	FULL FIRE EXTINGUISHER INSTALLED (2)					
9.	LIGHTS AND REFLECTORS OPERATIVE					
10.	EXHAUST SYSTEM					
* 12.	FUEL TANK, LINE AND INLET					
* 14.	ALL BRAKES OPERATIVE					
16.	SPRINGS AND ASSOCIATED PARTS					
* 17.	TIRES					
18.	CARGO SPACE					
* 19.	ELECTRIC WIRING					
* 20.	TAIL GATE AND DOORS SECURED					
22.	ANY OTHER DEFECTS (Specify)					

Q APPROVED	(If rejected give reasons on reverse under ARemarks.@ Equipment shall be approved if deficiencies are corrected prior to loading.)	SIGNATURE (of Inspector)	SIGNATURE (of Inspector)
Q REJECTED		ORIGIN	DESTINATION

ITEMS TO BE CHECKED PRIOR TO RELEASE OF LOADED VEHICLE		ORIGIN	DESTINATION
23.	MIXTURES OF MATERIAL PROHIBITED BY DOT REGS. ARE NOT LOADED ONTO THIS VEHICLE		
* 24.	LOAD IS SECURED TO PREVENT MOVEMENT		
25.	WEIGHT IS PROPERLY DISTRIBUTED AND VEHICLE IS NOT OVERWEIGHT		
* 27.	SPECIAL INSTRUCTIONS (DD Form 836) FURNISHED DRIVER		
* 28.	COPY OF VEHICLE INSPECTION (DD Form 626) FURNISHED DRIVER		
* 29.	PROPER PLACARDS APPLIED		
* 30.	SHIPMENT MADE UNDER DOT EXCEPTION 868		
SIGNATURE (of Inspector) ORIGIN		SIGNATURE (of Driver) ORIGIN	
SIGNATURE (of Inspector) DESTINATION		SIGNATURE (of Driver) DESTINATION	

COPY OF **DD FORM 626**

REPLACES EDITION OF 1 JUN 72, WHICH IS OBSOLETE.

SECTION 4

Explosives Siting Plan

A Draft Final Explosives Operations Site Approval was submitted to NOSSA and DDESB and received approval December 29, 2004 (Draft Final Explosives Operations Site Approval, Former Vieques Naval Training Range [VNTR], Vieques, Puerto Rico, Naval Facilities Engineering Command Atlantic, October 2004). The Explosives Operations Site Approval will be maintained on the Project Site along with the approved TCRA Work Plan.

SECTION 5

Geophysical Investigation Plan

No subsurface digital geophysical mapping (DGM) will be performed as part of this Time Critical Removal Action.

SECTION 6

Site Safety and Health Plan

The Site Safety and Health Plan which will be implemented for this TCRA is included as Appendix A. All contractor/subcontractor health and safety plans will meet or exceed the guidelines and procedures given in Appendix A and will be maintained in project files and on-site during the performance of all removal action activities.

Location Surveys and Mapping Plan

Survey and mapping tasks are key components of the MEC investigations for identifying the location of each MEC component in the field, reporting the locations of these components on maps and in spatial queries conducted in the GIS, and assisting with disposition of MEC components. This Location Surveys and Mapping Plan describes the methods, equipment, and accuracy requirements for location surveys and mapping for the removal action, MEC survey, and anomaly reacquisition described in this work plan.

7.1 Surveying

Surveying for this scope of work will be conducted by a professional land surveyor or the Remedial Action Contractor using GPS, USRADS, or other suitable navigation systems as given in.

7.2 Mapping

All control points and their corresponding location, identification, coordinates, and elevations will be stored digitally and will be reproducible for accurate plotting on maps. Each map will include a north arrow (grid, true, and magnetic) with the differences between them posted in minutes and seconds. Grid lines or tic marks posted at systematic intervals with their corresponding grid values will be shown on the edges of the maps. The legend will include standard symbols and a map index showing the relationship of the map to the overall project or site boundary. The state plane coordinates will be established for the corners of each grid area investigated.

GPS technology may be used to locate MEC components if this technology is readily available on the project and protocols are in place for recording, documenting, and integrating the location and MEC attributes with the MEC data management system.

7.2.1 Digital Data

The survey information collected will be sufficient to accurately relocate the position of the target component in the field and accurately plot the position of each component on a CAD map, in the GIS, or for use in statistical applications and tabular reports.

An overall planimetric design file will be created and digitized into a Microstation.DGN file at an elevation of zero. For contours and spot elevations, all associated data will be digitized into a second Microstation 3-D design file with each element at its correct elevation; topologically triangulated network (ttn) files will be created to model the topographic surface. The ttn file will be created using elements of the topographic file, and the appropriate spot elevations, contours, and breaklines necessary to create the ttn files will be used. The ttn files will be set up so they can be used with INROADS to create contours at their exact locations.

Each map sheet will be a standard metric A-1 size drawing (33.1 x 23.4 inches). Each sheet will include a standard border, revision block, title block, complete index sheet layout, bar scale, legend, grid minutes and seconds, and shall be plotted at the horizontal scale required.

The cell library, digital data, and all other supporting files or information will be provided. Production work files will be documented, tabulated, and described in the data manual. The manual will include the necessary information for a third party to recreate the products. The manual will be included as a "readme.txt" file with all distributed digital data.

Digital data will comply and be compatible with U.S. Navy requirements.

7.2.2 Digital Format

All data will conform to the Tri-Spatial Data Standards (TSDS) or CADD/GIS Technology Center Spatial Data Standards (SDS) and as outlined in the specific task order. Any and all deviations from these standards will be done only at the request of the U.S. Navy.

All location survey data and digital maps are transportable and can be copied to portable media for archiving or transfer to other team members. Available formats include CD (the preferred method), digital tape, or 3.5-inch floppy diskettes. The media used is dictated in part by the size of the files. All survey coordinates will be stored as part of the site-wide relational database.

7.3 Deliverables

The following deliverable items and data will be maintained as part of this scope of work:

- After Action Report.
- Field Survey – Original copies of field books, layout sheets, computation sheets, and computer printouts. These items will be suitably bound, marked, and packaged for delivery.
- Location Survey Points – Tabulated list of all surveyed control points showing the adjusted coordinates and elevations that were established for the specific MEC project.
- MEC Inventory – Tabular list of all MEC components with associated location and descriptions.
- All survey coordinates and MEC-related digital information will be stored as part of the site-wide relational database. These digital data will be backed up on the same schedule as the site-wide database.
- All unique items created or used to generate the deliverables, as requested in each task order.
- Drawings and Data – All maps and associated data will be provided.

Work, Data, and Cost Management Plan

8.1 Introduction

This Work, Data, and Cost Management Plan outlines how the project work will be managed and accomplished. Items pertaining to cost control are in general terms for tasks awarded under NAVFAC Atlantic to the Removal Action Contractor. Data will be managed by the Removal Action Contractor and will be transferred daily to Title II Services Contractor and will be compiled as part of the complete Vieques data management system (see Section 2.10.1).

8.2 Project Tasks

This project will be executed through a series of tasks, which are outlined in the Scope of Work for the Task Order awarded to the removal action contractor. The general task categories are given below and unless indicated otherwise will be carried out by the Removal Action Contractor. The general roles of the various contractors who will be carrying out work associated with this TCRA are shown in Figure 2-1.

Site Visit (Removal Action Contractor and Title II Services Contractor)

Technical Project Planning (Removal Action Contractor and Title II Services Contractor)

Removal Action Work Plan (Title II Services Contractor)

Vegetation Clearance (Removal Action Contractor)

Location Surveying and Mapping (Removal Action Contractor and Title II Services Contractor)

Establishment and Management of GIS (Title II Services Contractor)

Explosives Safety Submission (ESS) - developed and submitted as independent document by Title II Services Contractor

Site Specific Report (Title II Services Contractor)

Project Management (Removal Action Contractor)

Site Management (Title II Services Contractor)

8.3 Schedule

Table 8-1 gives the projected schedule for performing the TCRA.

TABLE 8-1
 Projected TCRA Schedule
Former VNTR, Vieques, Puerto Rico

Work Phase	Start Date - Completion Date
Final TCRA Work Plan	March 1, 2005 - April 1, 2005
Initial mobilization for removal action (UXO avoidance personnel and equipment)	April 8, 2005
Initiate vegetation clearance and boundary survey	April 11, 2005
Mobilization of removal action UXO crews and initiation of removal action activities	April 29, 2005
Removal action operations	April 29, 2005 - October 28, 2005
Demobilization of equipment and site personnel	October 28, 2005 - November 4, 2005

8.4 Communications

Project management communications for this project will generally be conducted as:

Field Investigation Tasks

Removal Action Contractor PM will communicate field investigation/removal action information to the Title II Services Contractor Site Manager. The Title II Services Contractor Site Manager or UXOQCS will communicate information to the Title II Services Contractor PM. The NAVFAC Atlantic Coordinator will be informed of all field related activities by the Title II Services Contractor or other Program Management staff.

Removal Action Contractor Task Order Management

The Removal Action Contractor PM or other staff will address all task order management information (e.g., budgetary issues, change orders) directly to the NAVFAC Atlantic Coordinator. If necessary the NAVFAC Atlantic Coordinator will communicate information to the Title II Services Contractor.

8.5 Records Management

Hard copies of primary records for the site will be retained by the Removal Action Contractor and Title II Services Contractor. Upon completion of phases of work prescribed under each task order, all files pertinent to the Vieques project will be compiled by Title II Services Contractor and will be maintained by the Title II Services Contractor Vieques Program Manager at the Virginia Beach Office of CH2M HILL, Virginia Beach, Virginia. The records will include, but are not limited to:

- Task order and modification files
- Correspondence
- Draft document submittals

- Responses to comments
- Final document submittals

During field investigations, records will be maintained in the respective contractor field offices and originals and/or copies of all files will be maintained by Title II Services Contractor. Following completion of definable phases of work all files will be transferred to the Title II Services Contractor Program Management office. These files will include, but are not limited to:

- Daily summary sheets
- Field logs/ notes
- Daily logs
- Health and safety records

8.6 Format and Content of Investigation Reports

All investigation reports will follow the formats and will contain the information given the scope of work for the task order under which the report is funded.

SECTION 9

Sampling and Analysis Plan

No sampling and analysis will be conducted as part of the work described in this work plan. However, sampling and analysis procedures for projects at the Former VNTR are documented in the Final Master Work Plan, Atlantic Fleet Weapons Training Facility, Vieques Island, Puerto Rico (CH2M HILL, June 12, 2003).

Quality Control Plan

This QCP details the approach, methods, and operational procedures to be employed by the Removal Contractor to perform quality control during MEC removal actions at the Former VNTR. This plan was developed in accordance with NOSSAINST 8020.15, NAVSEA OP 5 VOL I (Revision 7), DDESB TP 18, ANSI/ASQC Q10011-1994, ANSI 14010-1996, and OE MCX DID OE-005-11.01, and where applicable, USACE ER 1180-1-6: Construction Quality Management (1995); USACE ER 1110-1-12: Engineering and Design Quality Management (1993); and USACE ER 415-1-10: Contractor Submittal Procedures (1997). Additionally, local and state laws and regulations, ATF P 5400.7, DoD 6055.9-STD, DOT regulations, and OPNAVINST 5530.13: Dept. of Navy Physical Security Instructions for Sensitive Conventional Arms, Ammunition and Explosives.

10.1 Introduction

This QCP, and the requirements and systems established herein, are relevant and applicable to project work performed by the Removal Contractor and its subcontractors and suppliers.

The objectives of this QCP are to anticipate the specific operating requirements of the project, and to establish procedures to ensure that achieved quality meets technical design specifications and conforms to the requirements of the Task Order. Specifically, this plan:

- Identifies the project QC organization and defines each individual's respective authority, responsibilities, and qualifications.
- Defines project communication, documentation, and record keeping procedures.
- Establishes QC procedures, including the necessary supervision and tests, to ensure that work meets applicable specifications and drawings.

10.1.1 Project Background

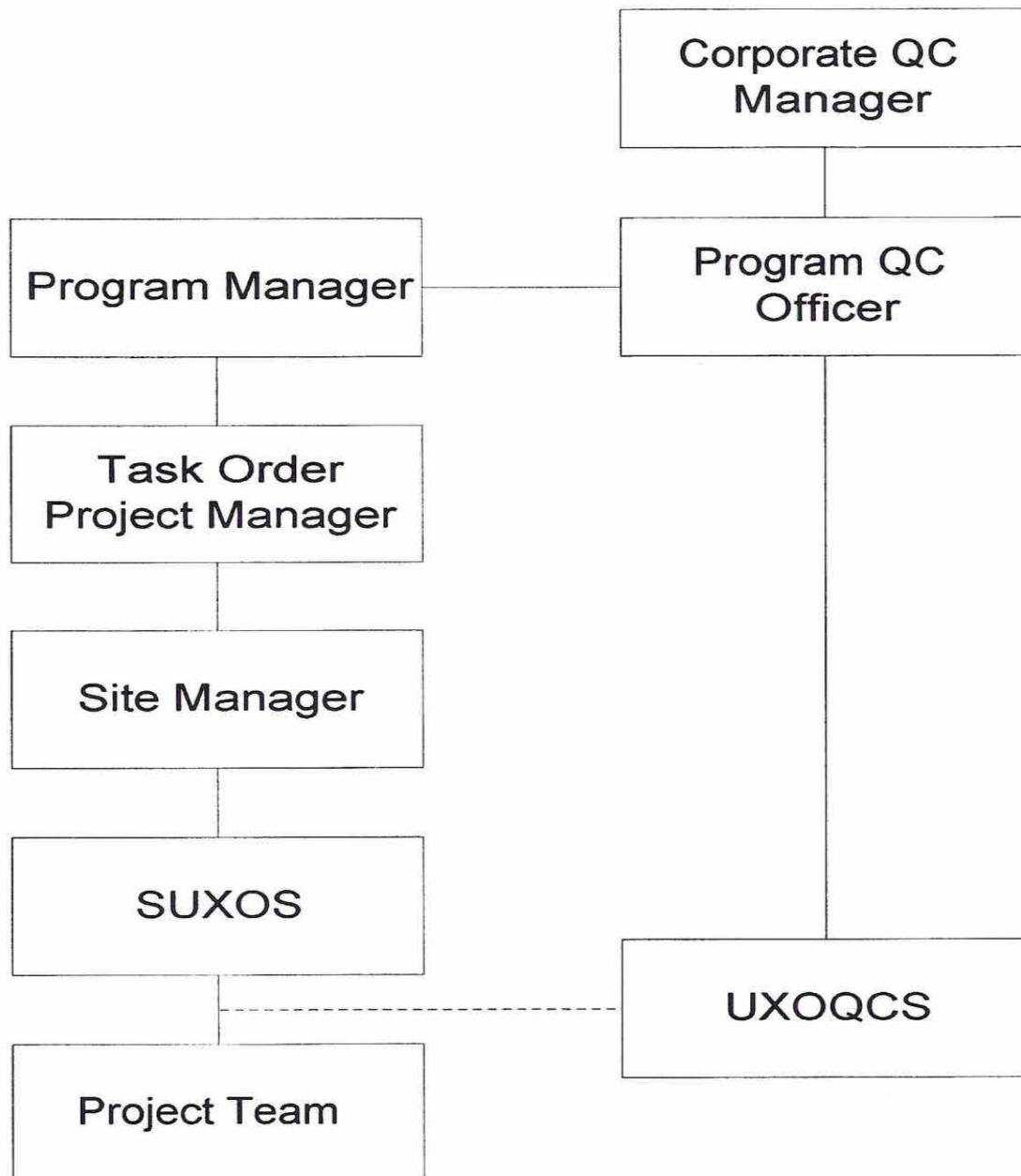
A detailed discussion of the project background was presented in Section 1 of this Work Plan.

10.1.2 Project Scope of Work

The project scope of work and detailed approach for completion was presented in Sections 1 and 2 of this work plan.

10.2 QC Personnel Organization and Responsibilities

The overall project organization and reporting structure is presented in this QCP and illustrated in the figure below. Quality Control personnel, organization, qualifications, and responsibilities are addressed in more detail in this section.



10.2.1 QC Personnel Qualifications and Training

Project staff members will be qualified to perform their assigned jobs in accordance with terms outlined by the scope of work. Resumes for proposed key personnel will be included in Removal Contractor SSWPs. All site personnel must have the training as outlined in Appendix A, which includes the OSHA 40 hour hazardous waste operators training and annual 8 hour refresher (29 CFR 1910.120).

10.2.2 Documentation of Qualification and Training

The review and verification of personnel qualifications are to be documented on Form 10-1, provided at the end of this section. The UXOQCS will maintain records documenting the required qualifications and training for each site worker. The UXOQCS will monitor expiration dates to provide advance warning to the Project Manager of when employees will require refresher training or other requirements. The UXOQCS will maintain records of site specific and routine training for personnel and visitors, as required by this Work Plan. These records will be maintained onsite for audit purposes.

10.2.3 Project Manager

The primary responsibility of the PM is the overall direction of the project and accountability for work activities undertaken as part of this project. As such, the PM will provide the managerial administrative skills to ensure that resource allocation, planning, execution, and reporting meet Contract and TO requirements. The global quality-related responsibilities of the PM may include, but are not limited to, the following:

- Organizing project staff and assigning responsibilities.
- Understanding the Contract and scope of work for the specific project.
- Ensuring that submittals are completed and submitted as required in the TO PWS.
- Communicating to the project staff regarding client requirements and QC practices.
- Identifying, providing documentation, and notifying the client and project team of changes in the scope of work, project documentation, and activities.
- Supervising the preparation and approval of project-specific procedures, work plans, and QC project plans.
- Approving project documents.
- Approving project execution methodologies.
- Disseminating project-related information from the client.
- Serving as liaison for communications with the client and subcontractors.
- Serving as liaison between the project staff and other internal groups.
- Deciding whether project documents require independent review.
- Investigating nonconformance and implementation of corrective actions.
- Evaluating the effect of nonconformance on the project and the appropriateness of reporting such items to the client.
- Providing appropriate documentation of nonconformance when reporting to the client.
- Serving as final reviewer prior to release of project information.
- Approving and signing outgoing correspondence.

- The PM may assign a portion of these responsibilities to the Site Manager and SUXOS, who will remain on site throughout the project field activities.

10.2.4 Site Manager

The Site Manager is responsible for efficiently applying the resources of the project team to execute the field phase of this TO. In addition, the Site Manager is responsible for local client interface regarding details of the project and the project team while assigned to the site. The Site Manager will assist the PM in maintaining sufficient resource allocations to meet the project schedule and budget and will provide daily feedback to the PM on project progress, issues requiring resolution, and other project-specific issues, as required. The quality-related responsibilities of the Site Manager include, but are not limited to, the following:

- Notifying the PM if problems arise with the schedule.
- Providing scheduling and integration of subcontractor services in support of the SUXOS.
- Serving as liaison for communications with project staff and subcontractors, as well as with the onsite client and regulatory agency representatives.
- Providing logistical support for field operations.
- Continuously monitoring work progress and adherence to authorized work scopes, budgets, and schedules.
- Aiding in the preparation of submittals.
- Leading weekly onsite status meetings.
- Reviewing the project work plans regularly.
- Interfacing daily with the subcontractors.

10.2.5 UXO Quality Control Specialist

The designated UXOQCS will be specified in the Removal Contractor's Site Specific Work Plan. The UXOQCS has authority to enforce the procedures defined in this QCP. In alignment with this authority, the UXOQCS has the authority to stop work in order to ensure that project activities comply with specifications of this QCP, the contract, and the Task Order. This authority applies equally to all project activities, whether performed by the Contractor or its subcontractors and suppliers.

The UXOQCS is responsible for planning and executing QC oversight of project operations, and ensuring compliance with specified QC requirements. Specifically, the UXOQCS is responsible for:

- Developing, assessing the effectiveness of, and maintaining this QCP and related procedures.
- Reviewing and approving the qualifications of technical staff and subcontractors.
- Planning and ensuring the performance of preparatory, initial, follow-up, and completion inspections for each definable feature of work.

- Identifying quality problems and verifying that appropriate corrective actions are implemented.
- Ensuring that the requisite QC records including submittals are generated and retained as prescribed in this QCP.
- Notifying the Title II Services Contractor 48 hours prior to beginning any required action of the preparatory and initial phases. At a minimum, the UXOQCS will use weekly QC Reports for the purposes of this notification.

The UXOQCS is to be physically onsite whenever project-related fieldwork is in progress. If the UXOQCS is to be absent from the site, with client approval, an alternative UXOQCS will be designated and will be given equivalent responsibilities and authority.

10.2.6 Program QC Manager

The Program QC Manager is responsible for developing, maintaining, and ensuring implementation of the quality program. This responsibility includes overseeing activities under the guidance of this QC plan, performing periodic reviews of the processes being implemented, evaluating any recommendations made by the project team over the course of the program regarding use of these processes, and implementing continuous improvement evaluations of the quality program. The Program QC Manager reports directly to the Corporate Quality/HS&E Manager. Specific responsibilities of the Program QC Manager include:

- Developing program-level QC program consistent with corporate guidance and requirements for MR projects.
- Approving project-level QC plans.
- Performing reviews to ensure that sound professional engineering and other technical and regulatory capabilities are applied during planning and execution of MEC operations.
- Monitoring results of site audits.
- Conducting project audits.
- Ensuring that corrective actions are implemented promptly and fully.
- Developing lessons-learned for team distribution.
- Conducting quality training for UXOQCS.
- Evaluating the qualifications of the quality team.

10.3 Definable Features of Work (DFOWs) and the Three-Phase Control Process

Quality control on the VNTR project will be monitored through all of the Definable Features of Work (DFOWs) using a three-phase control process. The DFOWs and the three-phase control process are discussed in the following subsections.

10.3.1 Definable Features of Work

The definable features of work (DFOW) for this task order are divided into activities related to planning, field operations and final project reports and close-out:

10.3.1.1 Planning

- Pre-Mobilization Activities: System set-up for GIS, document management and control, data management and subcontracting
- Technical Project Planning: Technical and operational approach
- Removal Contractor Site Specific Work Plan and SOP's: Preparation and obtaining approval.

10.3.1.2 Field Operations

- Site Preparation: Mobilization, survey, vegetation removal, surface clearance
- MEC investigation and removal
- MPPEH/MD management (inspection/ demilitarization/ certification/ verification/ disposition)
- Demilitarization of MEC
- Site Restoration and Demobilization

10.3.1.3 Final Project Reports and Close-Out

- Site-Specific Final Report: Preparation and obtaining approval
- Proposed Plan and Decision Documents: Preparation and obtaining approval
- Obtain MEC Response Complete Acceptance
- Data Archiving and Project Closeout

10.3.2 Mobilization

This definable feature of work includes all required activities associated with mobilizing at the start of the project.

10.3.3 Location Surveying and Mapping

This definable feature of work includes all activities relating to grid layout activities.

10.3.4 Vegetation Removal

This definable feature of work includes all activities relating to the removal of vegetation. This feature may need to be subdivided as needed, especially if a more involved phased approach is used such as prescribed burning followed by manual/mechanical clearance.

10.3.5 MEC Surface Removal

This definable feature of work includes all activities relating to UXO sweeps to ensure that no surface MEC is present.

10.3.6 MEC Disposal

This definable feature of work includes all required activities associated with disposing of MEC or explosively venting items.

10.3.7 Scrap Disposal

This definable feature of work includes all required activities associated with managing and disposing of scrap metal recovered during MEC operations.

10.3.8 Site Restoration

This definable feature of work includes all required activities associated with restoring the site to acceptable condition.

10.3.9 Demobilization

This definable feature of work includes all required activities associated with demobilizing at the completion of the project.

10.3.10 Three Phases of Control

The UXOQCS is to ensure that the three-phase control process, including the Preparatory Phase, Initial Phase and Follow-Up Phase, is implemented for each DFOW listed in this QCP. Each control phase is important for obtaining a quality product and meeting the TO objectives, however the preparatory and initial audits are particularly valuable in preventing problems. Production work is not to be performed on a DFOW until a successful preparatory and initial phase has been completed.

10.3.10.1 Preparatory Phase

The preparatory phase culminates with the planning and design process leading up to actual field activities. Successful completion of the Preparatory Phase verifies that the TO delivery, QC, and safety plans have been completed and are ready to be implemented. The following actions will be performed as applicable for each DFOW:

1. Confirm that the appropriate technical procedures are incorporated into the project work plan and review procedures.
2. Confirm that adequate testing is called for to assure quality delivery.

3. Confirm definition of preliminary work required at the work site and examine the work area to confirm required preliminary work has been properly completed.
4. Confirm availability of required materials and equipment. Examine materials and equipment to confirm compliance with approved submittals and procedures. Ensure equipment testing procedures are in place, with control limits and frequency.
5. Confirm qualifications of personnel and that roles/responsibilities are well-defined and communicated.
6. Confirm with the UXOSO that the site health and safety plan and activity hazard analyses (AHA) adequately address the work operations and that applicable safety requirements have been incorporated into the plan.
7. Discuss methods to be employed during the field activities.
8. Confirm any required permits and other regulatory requirements are met.
9. Verify that lessons learned during previous similar work have been incorporated as appropriate into the project procedures to prevent recurrence of past problems.

Project staff must correct or resolve discrepancies between existing conditions and the approved plans/procedures identified by the UXOQCS and the team during the Preparatory Phase. The UXOQCS or designee must then verify that unsatisfactory and nonconforming conditions have been corrected prior to granting approval to begin work.

Results of the activity are to be documented in the Preparatory Inspection Checklist (Form 10-2) specific for the DFOW and summarized in the Weekly QC Report.

10.3.10.2 Initial Phase

The initial phase occurs at the startup of field activities that are associated with a specific DFOW. The initial phase confirms that the Project QCP, other applicable work plan sections, and procedures are being effectively implemented and the desired results are being achieved.

During the initial phase, the initial segment of the DFOW is observed and inspected to ensure that the work complies with contract and work plan requirements. The initial phase should be repeated when acceptable levels of specified quality are not being met.

The following shall be performed for each DFOW:

1. Establish the quality of work required to properly deliver the TO in accordance with contract requirements. The UXOQCS ensures that supervision has made the work crews aware of expectations associated with the field methods established under the preparatory phase.
2. Resolve conflicts. Should conflicts arise in establishing the baseline quality for the DFOW, the responsibility to resolve the conflict falls to the Project Manager. Should the conflict not be resolved in a manner that satisfies the project requirements, the UXOQCS must elevate the conflict to the program level (Program QC Manager) and issue a non-conformance report. The UXOQCS may direct a cessation of work activity, with the

concurrence of the Program QC Manager, should the issue jeopardize the results of the DFW, or put the TO at risk of non-compliant performance.

3. Verify with the UXOSO that the site health and safety plan and activity hazard analyses were developed to ensure that the identified hazards adequately addressed field conditions. Confirm that applicable safety requirements are being implemented during field activities.

Upon completion of the initial phase activities, results are to be documented in the Initial Phase Inspection Checklist (Form 10-3), the QC logbook and summarized in the Weekly QC Report. Should results be unsatisfactory, the initial phase will be rescheduled and performed again.

10.3.10.3 Follow-up Phase

Completion of the initial phase of QC activity then leads directly into the follow-up phase, which addresses the routine day-to-day activities on the field site. Inspection/audit activities associated with each DFW are addressed in Section 10.4. Specific concerns associated with the follow-up include:

1. Inspection of the work activity to ensure work is in compliance with the contract and work plans.
2. Evaluation and confirmation that the quality of work is being maintained at a level no less than that established during the initial phase.
3. Evaluation and confirmation that required testing is being performed in accordance with procedures established during the preparatory phase and confirmed during the initial phase.
4. Confirmation that non-conforming work is being corrected promptly and in accordance with the direction provided by the UXOQCS.

To conduct and document these inspections, the UXOQCS is to generate the Follow-up Phase Inspection Checklist (Form 10-4). The follow-up phase inspections will be performed daily, or as otherwise identified in this QCP until the completion of each DFW.

The UXOQCS is responsible for onsite monitoring of the practices and operations taking place and verifying continued compliance with the specifications and requirements of the contract, TO, and approved project plans and procedures. He is also responsible for verifying that a daily Health and Safety Inspection is performed and documented as prescribed in the project SSHP. Discrepancies between site practices and approved plans/procedures are to be resolved and corrective actions for unsatisfactory and nonconforming conditions or practices are to be verified by the UXOQCS or a designee prior to granting approval to continue work. Follow-up inspection results are to be documented in the QC logbook and summarized in the Weekly QC Report.

10.3.10.4 Additional Audits

Additional audits performed on the same definable feature of work may be required at the discretion of the Program QC Officer or the UXOQCS. Additional preparatory and initial audits are generally warranted under any of the following conditions: unsatisfactory work,

changes in key personnel, resumption of work after a substantial period of inactivity (e.g., 2 weeks or more), or changes to the project scope of work/specifications.

10.3.10.5 Final Acceptance Audit

The Final Acceptance Inspection is performed, upon conclusion of the DFOW and prior to closeout, to verify that project requirements relevant to the work are satisfied. Outstanding and nonconforming items are to be identified and documented on the Final Inspection Checklist (Form 10-5). As each item is resolved, it is to be noted on the checklist.

10.4 Inspection/Audit Procedures

The UXOQCS is responsible for verifying compliance with this QCP through audits and surveillance. The UXOQCS or a designee is to inspect/audit the quality of work being performed for the definable feature of work. The UXOQCS or a designee is to verify that procedures used conform to applicable specifications stated in this Work Plan or other applicable guidance. Identified deficiencies are to be communicated to the responsible individual and documented in the QC log and Weekly QC Report. Corrective actions are to be verified by the UXOQCS and recorded in the Weekly QC Report.

The specific QC audit procedures for the DFOWs, including the phase during which it is performed, the frequency of performance, the pass/fail criteria and actions to take if failure occurs, are presented in Table 10-1.

The Inspection Schedule and Tracking Form (Form 10-6) is to be used by the UXOQCS for planning, scheduling and tracking the progress of audits for this project. The information on the form is to be kept up to date and reviewed by the UXOQCS for planning purposes. Audit records are to be maintained as part of the project QC file.

10.5 QC Testing

QC testing will be performed to ensure that MEC removal is being performed according to the project Definable Quality Objective and prior to submitting to the Navy Technical Representative and Title II Services Contractor for QA testing.

10.5.1 Testing Procedures

The UXOQCS will inspect each grid to determine whether or not the grid has been cleared IAW performance requirements presented in the QC Section of the Removal Action Contractor's Work Plan. The UXOQCS will re-sweep this portion of the grid using the same geophysical instrument. The results of the QC inspections, both passing and failing, will be recorded in the QC log. For any grid that fails a QC inspection, the grid will be completely reworked and re-QC'd before submitting the grid for QA inspection.

Pass/Fail Criteria

Grid failure will result if:

- more than 2 munitions items which have a shape, size, or mass greater than or equal to a 20mm and less than a 30mm projectile is not removed from a grid,

- more than 1 munitions item which has a shape, size, or mass greater than or equal to a 30mm and less than a 40mm projectile is not removed from the grid, or
- any munitions items, which have a shape, size, or mass equal to or greater than a 40mm projectile is not removed from the grid.

If grid failure occurs the entire grid will be reworked.

Level of QC Inspection

The Mil-Std-1916 (and accompanying Mil-Hdbk-1916 will be implemented for performing QC as part of this TCRA for inspection of cleared grids. The Mil-Std-1916 will be used to determine the level of QC using the following:

- Initial Verification Level (VL) will be VII for attributes sampling plan,
- The switching method will be used as given in the Mil-Kdbk-1916 to determine decreases or increases in QC level, and
- A lot will be comprised of 80 lanes, which are defined as 1.5m wide by 30m long. This is the equivalent number of lanes for 4-30m x 30m grids and approximates 0.9 acre in area.

TABLE 10-1
Definable Features of Work Auditing Procedures

Activity	Definable Feature of Work with Auditable Function	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criteria	Action if Failure Occurs
Planning	GIS Setup (<i>Pre-Mobilization Activities</i>)	Verify GIS system has been set up and is ready for site data	PP	Once	GIS system has been set up and is ready for site data	Do not proceed with field activities until criterion is passed
Planning	Document management and control (<i>Pre-Mobilization Activities</i>)	Verify appropriate measures are in place to manage and control project documents	PP	Once	Appropriate measures are in place to manage and control project documents	Do not proceed with field activities until criterion is passed
Planning	Data Management (<i>Pre-Mobilization Activities</i>)	Verify appropriate measures are in place to manage and control project data	PP	Once	Appropriate measures are in place to manage and control project data	Do not proceed with field activities until criterion is passed
Planning	Subcontracting (<i>Pre-Mobilization Activities</i>)	Verify Subcontractor qualifications, training, licenses	PP/IP	Once	Subcontractors' qualifications, training, and licenses are up to date and acceptable	Ensure subcontractor provides the qualifications, training, and licenses or change subcontractor
Planning	Technical approach (<i>Technical Project Planning</i>)	Verify that technical approach has been agreed on by project team	PP/IP	Once	Technical approach has been agreed on by project team	Do not proceed with field activities until criterion is passed
Planning	Operational approach (<i>Technical Project Planning</i>)	Verify that operational approach has been agreed on by project team	PP/IP	Once	Operational approach has been agreed on by project team	Do not proceed with field activities until criterion is passed
Planning	Work Plan preparation and approval (<i>Technical Project Planning</i>)	Verify that Work Plan has been prepared and approved	PP/IP	Once	Work Plan has been prepared and approved	Do not proceed with field activities until criterion is passed
Field Operations	Site preparation (including mobilization)	Verify all project plans are approved	PP/IP	Once	All project plans are approved	Do not proceed with field activities until criterion is passed
Field Operations	Site preparation (including mobilization)	Verify local agencies are coordinated	PP/IP	Once	Local agencies are coordinated	Do not proceed with field activities until criterion is passed
Field Operations	Site preparation (including mobilization)	Verify equipment and services are procured	PP/IP	Once	Equipment and services are procured	Proceed only with activities for which equipment has been procured Procure remaining equipment
Field Operations	Site preparation (including mobilization)	Verify communications and other logistical support are coordinated	PP/IP	Once	Communications and other logistical support are coordinated	Do not proceed with field activities until criterion is passed
Field Operations	Site preparation (including mobilization)	Verify Emergency Services are coordinated	PP/IP	Once	Emergency Services are coordinated	Do not proceed with field activities until criterion is passed

TABLE 10-1
Definable Features of Work Auditing Procedures

Activity	Definable Feature of Work with Auditable Function	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criteria	Action if Failure Occurs
Field Operations	Site preparation (including mobilization)	Verify operating schedules are finalized	PP/IP	Once	Operating schedules are finalized	Proceed only with those operations with finalized operating schedules
Field Operations	Site preparation (including mobilization)	Verify explosive storage and MEC debris/scrap storage areas are established	PP/IP	Once	Explosive storage and MEC debris/scrap storage areas are established	Do not proceed with field activities until criterion is passed
Field Operations	Site preparation (including mobilization)	Verify site-specific training is performed and acknowledged	PP/IP	Once	Site-specific training is performed and acknowledged	Do not proceed with field activities until criterion is passed
Field Operations	Site preparation (including mobilization)	Verify project plans are reviewed and acknowledged	PP/IP	Once	Project plans are reviewed and acknowledged	Do not proceed with field activities until criterion is passed
Field Operations	Site survey	Verify Surveyor Qualifications	PP/IP	Once	Surveyor's qualifications are up to date and acceptable	Ensure surveyor provides the qualifications change surveyor
Field Operations	Site survey	Verify Surveyor Licenses	PP/IP	Once	Surveyor's licenses are up to date and acceptable	Ensure surveyor provides the licenses or change surveyor
Field Operations	Site survey	Verify benchmarks for survey are established and documented	PP/IP	Once	Benchmarks for survey are established and documented	Ensure benchmarks for survey are established and documented prior to performing survey
Field Operations	Site survey	Verify site boundaries have been established	PP/IP	Once	Site boundaries have been established	Do not proceed with dependent field activities until criterion is passed
Field Operations	Site survey	Verify proper marker type, material and placement method	PP/IP	Once	Proper marker type, material and placement method were used	Replace markers as necessary to comply with requirement
Field Operations	Site survey	Verify Surveyor notes are legible, accurate and complete	IP	Once	Surveyor notes are legible, accurate and complete	Ensure surveyor replaces deficient notes with legible, accurate and complete notes
Field Operations	Site survey	Verify Stake Alignment and spacing intervals	IP	Once	Stake Alignment and spacing intervals are as specified in Work Plan	Replace stakes not aligned as specified
Field Operations	Vegetation removal	Verify personnel qualifications and training	PP/IP	Once	Personnel qualifications and training are appropriate	Ensure subcontractor provides appropriately trained and qualified personnel or replace subcontractor

TABLE 10-1
Definable Features of Work Auditing Procedures

Activity	Definable Feature of Work with Auditable Function	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criteria	Action if Failure Occurs
Field Operations	Vegetation removal	Verify environmental controls are correct and functional	IP/FP	Once	Environmental controls are correct and functional	Ensure that appropriate environmental controls are in place prior to proceeding with vegetation removal
Field Operations	Vegetation removal	Verify vegetation removal conducted IAW WP Technical Management Plan	FP	Daily	Vegetation removal conducted IAW WP Technical Management Plan	Stop vegetation removal activities until full compliance can be assured and any activities not performed within compliance are re-evaluated and re-performed if necessary
Field Operations	Surface Clearance	Verify equipment testing	IP/FP	Once/Daily	Equipment passes daily function test in equipment check area	Repair or replace instrument
Field Operations	Surface Clearance	Verify area/boundary	PP/IP	Once	Area/boundary is correct	Stop activities until area/boundary can be verified
Field Operations	Surface Clearance	Verify work methods	IP/FP	Daily	Work methods are being performed IAW the WP and SOPs	Stop activities until WP and SOPs are being followed and any activities not performed within compliance are re-evaluated and re-performed if necessary
Field Operations	Surface Clearance	Verify Team separation distance	IP/FP	Daily	Team separation distance is appropriate for work being performed	Stop activities until appropriate separation distance is being followed
Field Operations	Surface Clearance	Verify clearance conducted IAW WP Technical Management Plan	IP/FP	Daily	Clearance conducted IAW WP Technical Management Plan	Stop activities until full compliance can be assured and any activities not performed within compliance are re-evaluated and re-performed if necessary
Field Operations	Surface Clearance	Check a portion of each grid/lot to insure Acceptance Criteria are met as defined in the RAC Work Plan.	FP	Each Occurrence	See Section 10.8	See Section 10.8
Field Operations	Inspection (MPPEH Management)	Verify personnel qualifications	IP/FP	Once	Personnel are qualified	Replace unqualified personnel with qualified personnel

TABLE 10-1
Definable Features of Work Auditing Procedures

Activity	Definable Feature of Work with Auditable Function	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criteria	Action if Failure Occurs
Field Operations	Certification (MPPEH Management)	Verify Inspection conducted IAW MPPEH Management Plan	IP/FP	Daily/Each Occurrence	Inspection being conducted IAW WP MPPEH Management Plan	Stop activity until full compliance can be assured and any activities not performed within compliance are re-evaluated and re-performed if necessary
Field Operations	Certification (MPPEH Management)	Verify personnel qualifications	IP/FP	Once	Personnel are qualified	Replace unqualified personnel with qualified personnel
Field Operations	Certification (MPPEH Management)	Verify Certification is conducted IAW WP MPPEH Management Plan	IP/FP	Daily/Each Occurrence	Certification is conducted IAW WP MPPEH Management Plan	Stop activity until full compliance can be assured and any activities not performed within compliance are re-evaluated and re-performed if necessary
Field Operations	Disposal (MPPEH Management)	Verify Disposal is conducted IAW WP MPPEH Management Plan	IP/FP	Daily/Each Occurrence	Disposal is conducted IAW WP MPPEH Management Plan	Stop activity until full compliance can be assured and any activities not performed within compliance are re-evaluated and re-performed if necessary
Field Operations	Demilitarization of UXO	Verify personnel qualifications	IP/FP	Once	Personnel are qualified	Replace unqualified personnel with qualified personnel
Field Operations	Demilitarization of UXO	Verify operations conducted IAW contractor SOP	IP/FP	Each Occurrence	Operations conducted IAW Subcontractor SOP	Stop activity until full compliance can be assured and any activities not performed within compliance are re-evaluated and re-performed if necessary
Field Operations	Demobilization	Verify that all equipment is inspected, packaged, and shipped to appropriate location.	FP	Once	All equipment is inspected, packaged, and shipped to appropriate location.	Ensure equipment is inspected, packaged, and shipped to appropriate location
Field Operations	Demobilization	Verify facilities-support infrastructures are dismantled and shipped to appropriate location.	FP	Once	Facilities-support infrastructures are dismantled and shipped to appropriate location.	Ensure facilities-support infrastructures are dismantled and shipped to appropriate location

Field Operations Targets

TABLE 10-1
Definable Features of Work Auditing Procedures

Activity	Definable Feature of Work with Auditable Function	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criteria	Action if Failure Occurs
Final Project Reports and Close-out	Site Specific Final Report preparation and approval	Verify field site is returned to original condition	FP	Once	Field site is returned to original condition	Ensure field site is returned to original condition
Final Project Reports and Close-out	Site Specific Final Report preparation and approval	Verify tabulation of all MEC, MD, and other material recovered during the removal actions are accurate and complete	IP	Once	Tabulation of all MEC, MD, and other material recovered during the removal actions are accurate and complete	Ensure tabulation of all MEC, MD, and other material recovered during the removal actions are accurate and complete
Final Project Reports and Close-out	Decision Document preparation and approval	Verify reviews performed by project, senior technical and program teams	FP	Once	Reviews performed by project, senior technical and program teams	Ensure reviews performed by project, senior technical and program teams
Final Project Reports and Close-out	MEC Response Completion Acceptance	Verify Final Report, Proposed Plan and Decision Document has been approved	IP	Once	Final Report, Proposed Plan and Decision Document has been approved	Take appropriate actions to ensure document get approved
Final Project Reports and Close-out	Archiving	Verify data back-up systems are in place	IP	Once	Data back-up systems are in place	Ensure data back-up systems are in place
Final Project Reports and Close-out	Project Closeout	Verify purchase orders have been closed out	IP	Once	Purchase orders have been closed out	Ensure purchase orders are closed out
Final Project Reports and Close-out	Project Closeout	Verify invoices completed and approved	IP	Once	Invoices completed and approved	Ensure invoices are completed and approved

10.5.2 Documentation of Testing

Test results are to be documented by the individual performing the test. Calibration and maintenance records associated with the measuring and testing equipment (M&TE) are to be generated by the individual performing the activity. Documentation for calibration and maintenance of M&TE is to be made available to the COR upon request.

The UXOQCS is responsible for ensuring that the tests are performed and that the results are summarized in and provided with the Weekly QC Report. Any failing test will be noted on the deficiency log so it can be tracked until such time as rework and re-testing can be performed and corrective action is verified.

10.6 Calibration and Maintenance

Calibration and maintenance of geophysical instruments, radios, cell phones, vehicles, machinery, air monitoring equipment (if present), etc., will be performed per manufacturer's specifications. Geophysical detection equipment will be tested daily. Records of these activities are to be generated by the individual performing the activity with copies provided to the UXOQCS for retention in the project QC file.

10.7 Government QA Activities

Although the government QA procedures will be subject to change depending on revisions to Navy procedures, the following QA procedures can be expected as a minimum.

10.7.1 MEC Surface Removal or Investigations

Utilizing the same geophysical detection equipment as the Removal Contractor, The Navy Technical Representative and/or the Title II Services Contractor will perform a QA inspection on a portion, as determined by the Navy's QA Plan, of a grid that has passed the Removal Contractor's QC process. If a grid fails as defined by the Navy's QA Plan, then the Navy Technical Representative and/or the Title II Services Contractor will implement corrective actions, which may include more stringent QA standards.

10.8 QA Pass/Fail Criteria

A grid will be considered a QA failure if:

- more than 2 munitions items which have a shape, size, or mass greater than or equal to a 20mm and less than a 30mm projectile is not removed from a grid,
- more than 1 munitions item which has a shape, size, or mass greater than or equal to a 30mm and less than a 40mm projectile is not removed from the grid, or
- any munitions items, which have a shape, size, or mass equal to or greater than a 40mm projectile is not removed from the grid.

10.9 Deficiency Management

This section includes provisions for preventing quality problems and facilitating process improvements as well as for identifying, documenting, and tracking deficiencies until corrective action has been verified. Deficiency notices and corrective action requests will be provided to USEPA, PREQB, NOSSA, and USFWS during project status meetings or in project status documentation.

10.9.1 Continual Improvement

Project staff at all levels are to be encouraged to provide recommendations for improvements in established work processes and techniques. The intent is to identify activities that are compliant but can be performed in a more efficient or cost-effective manner. Typical quality improvement recommendations include identifying an existing practice that should be improved (e.g., a bottleneck in production) and/or recommending an alternative practice that provides a benefit without compromising prescribed standards of quality. Project staff are to bring their recommendations to the attention of project management or the QC staff through verbal or written means. However, deviations from established protocols are not to be implemented without prior written approval by the Project Manager and concurrence of the UXOQCS. Where a staff-initiated recommendation results in a tangible benefit to the project, public acknowledgment is to be given by the Project Manager.

10.9.2 Deficiency Identification and Resolution

While deficiency identification and resolution occurs primarily at the operational level, QC inspections provide a backup mechanism to address problems that either are not identified or cannot be resolved at the operational level. Through implementation of the inspection program, the QC staff is responsible for verifying that deficiencies are identified, documented, and corrected in a timely manner. If the UXOQCS determines that a specific action can be taken to prevent the cause or similar cause for failure, the action will be implemented. An attempt to identify additional potential causes of failure will also be made (e.g., weather event, site condition change, other activities that would result in items being introduced to a worked grid).

10.9.3 Corrective Action Request

A Corrective Action Request (CAR) (Form 10-8) can be issued by any member of the project staff, including the Contractor and subcontractor employees. If the individual issuing the CAR is also responsible for correcting the problem, then he or she should do so and document the results on Part B of the CAR. Otherwise, the CAR should be forwarded to the Project Manager, who is then responsible for evaluating the validity of the request, formulating a resolution and prevention strategy, assigning personnel and resources, and specifying and enforcing a schedule for corrective actions. Once a corrective action has been completed, the CAR and supporting information are to be forwarded to the UXOQCS for closure.

In addition to observing actual work operations, CARs are to be reviewed during follow-up QC inspections. The purposes of this review are: to ensure that established protocols are

implemented properly; to verify that corrective action commitments are met; to ensure that corrective actions are effective in resolving problems; to identify trends within and among similar work units; and to facilitate system root cause analysis of larger problems. Particular attention is to be given by the QC staff to work units that generate either an unusually large or unusually small number of CARs.

The UXOQCS will determine whether a written Corrective Action Plan (CAP) (Form 10-9) is necessary, based on whether or not any of the following are met: the CAR priority is high; deficiency requires a rigorous corrective action planning process to identify similar work product or activities affected by the deficiency; or deficiency requires extensive resources and planning to correct the deficiency and to prevent recurrence. The CAP is developed by a Project Manager designee and approved and signed by the Project Manager. The CAP is to indicate whether it is submitted for informational purposes or for review and approval. In either event, operational staff are to be encouraged to discuss the corrective action strategy with the QC staff throughout the process.

10.9.4 Deficiency and Corrective Action Tracking

Each CAR is to be given a unique identification number and tracked by the appropriate line manager until corrective actions have been taken and documented in Part B of the form, and the CAR is submitted to the UXOQCS or a designee for verification and closure.

10.9.5 Documentation

The lessons learned through the deficiency management process are documented on CARs and CAPs. To share the lessons learned with the Title II Services Contractor and the Government, these documents are submitted to the Title II Services Contractor through the Weekly QC Report (Form 10-10).

CARs should be cited in the Weekly QC Report. Minor deficiencies that are identified during a QC inspection but can be readily corrected and verified in the field are to be documented in the QC log and Weekly QC Report without initiating a CAR. Deficiencies identified in a QC inspection but that cannot be readily corrected are to be documented by the QC staff on a CAR and in the Weekly QC Report. Copies of CARs are to be referenced in and attached to the Weekly QC Report. CAPs will also be attached to Weekly QC Reports to document the final outcome of the deficiency. Similar or related deficiencies may be addressed on a single CAP. All CARs and CAPs will be maintained on site with the project files and will be subject to audit.

10.10 Reports

The UXOQCS is responsible for the preparation and submittal of the Weekly QC Report to the NTR, the Project Superintendent for the project file, and providing concurrent courtesy copies to the Project Manager. The original and one copy of the Weekly QC Report with attachments are to be submitted to the Title II Services Contractor on the first work day following the date covered by the report. All calendar days, including weekends and holidays, are to be accounted for throughout this project. As a minimum, one report is to be prepared and submitted for every continuous 7 days of no work.

The Weekly QC Report is to provide an overview of QC activities performed each day, including those performed for subcontractor and supplier activities. The QC reports are to present an accurate and complete picture of QC activities. They are to report both conforming and deficient conditions, and should be precise, factual, legible, and objective. Copies of supporting documentation, such as checklists and surveillance reports, are to be attached.

A field QC log is to be maintained by the UXOQCS and assigned to each member of the QC staff for use in documenting details of field activities during QC monitoring activities. At the end of each day, copies of the log entries are to be attached to the Weekly QC Report. The information in the QC log provides backup information and is intended to serve as a phone log and memory aid in the preparation of the Weekly QC Report and in addressing follow-up questions that may arise.

QC and Health and Safety staff input for the Weekly QC Report is to be provided in writing to the UXOQCS at a previously agreed upon time and place, generally no later than about 1 hour before normal close of business. For the sake of simplicity and completeness, the format for QC staff input should follow the same as for the Weekly QC Report with only the relevant sections completed.

Each Weekly QC Report is to be assigned and tracked by a unique number comprised of the Delivery Order number followed by the date expressed as DDMMYY. In the case of "no work day" reports, the report number is to comprise the Delivery Order, the last date covered, the number of days covered, and the initials "NW." For example, DO #XXXX-041104 is the report for site work performed on 11 April 2004, and DO #XXXX-052904-3NW is the report for the three no work days from 27 May 2004 through 29 May 2004. Copies of Weekly QC Reports with attachments and QC logs no longer in use are to be maintained in the project QC file. Upon project closeout, all QC logs are to be included in the project QC file.

10.11 Submittal Management

The UXOQCS is responsible for ensuring, through detailed review, that submittals as well as the materials and the work they represent, are in full compliance with applicable contract specifications. The UXOQCS is also responsible for ensuring that a project file is established and maintained, and that accountable project documents are retained and controlled appropriately.

10.11.1 Project Records

The Removal Contractor Project Manager is to establish and maintain an onsite project file in accordance with contract requirements and NAVFAC Atlantic policies for document control. The Project Manager is responsible for controlling access to the project file to ensure that records are not lost or misplaced. The purpose of this file is to maintain a complete set of all documents, reports, certifications, and other records that provide information on project plans, contract agreements, and project activities. The initial file will be structured to include a record copy of the following documents:

- Schedule and progress reports

- Technical specifications, including addenda and modifications thereof
- Change orders and other contract modifications
- Engineer Field Orders
- Manufacturer's certificates
- Survey Records
- Daily work activity summary reports, which may include:
 - Weekly QC Report
 - Daily Health and Safety Report
 - Reports on any emergency response actions
 - Test records
 - Records of site work
 - Chain-of-custody records
 - Reports on any spill incidents
 - Truck load tickets and shipping papers
- Other items as required by the Contracting Officer Representative:
 - Conversation logs
 - Meeting minutes and agenda
 - Inspection logs and schedules
 - Photo documentation
 - Site maps
 - As built drawings

As the project activities progress, the Removal Contractor Project Manager will monitor usefulness of the project filing system for information retrieval. If he or she finds that additional file sections are needed, he or she will expand this initial filing structure to include additional sections.

10.11.2 Transmittal to the Title II Services Contractor

Submittals to the Title II Services Contractor are to be accompanied by a completed submittal form. This form is to be used for submittals requiring the Title II Services Contractor response and for information-only submittals in accordance with the instructions on the reverse side of the form. This form is to be properly completed by filling out the heading blank spaces and identifying each item submitted. Care is to be exercised to ensure proper listing of the Task Order, specification paragraph, and/or sheet number of the plans pertinent to the data submitted for each item.

10.11.3 Documentation

In addition to the documentation requirements specified above, the following requirements apply to this project. The QC file is to be maintained by the UXOQCS and is to be controlled as an integral component of the project files. Shop drawings, work orders, and change orders issued are to be provided to the UXOQCS. It is the responsibility of the UXOQCS to maintain this technical information and keep it current and recorded as it is revised. Technical information is not to be replaced or revised without receipt of a properly authorized change order or revision. Copies of purchase orders or subcontracts requiring

inspection are to be provided to the UXOQCS for receiving and recording purposes. Copies of required certifications received are to be maintained in the QC file and are to be submitted to the Title II Services Contractor in accordance with agreements made at the coordination meeting. Changes in submittal progress and QC activities related to submittals are to be summarized in the Weekly QC Report.

FORM 10-1
PERSONNEL QUALIFICATION VERIFICATION FORM

NAME: _____ **POSITION** _____

CONTRACT: N62470-02-D-3052/CTO-0047

REVIEW ITEMS		QUALIFICATIONS	VERIFIED BY/DATE
EXPERIENCE	REQUIRED:		
	ACTUAL:		
EDUCATION	REQUIRED:		
	ACTUAL:		
CERTIFICATIONS & QUALIFICATIONS	REQUIRED:		
	ACTUAL:		
TRAINING	REQUIRED:		
	ACTUAL:		
OTHER	REQUIRED:		
	ACTUAL:		

FORM 10-2
PREPARATORY INSPECTION CHECKLIST
(PART I)

Contract: N62470-02-D-3052/CTO-0047

Date: _____

Title and No. of Technical Section: _____

A. Planned Attendees:

	<u>Name</u>	<u>Position</u>	<u>Company</u>
1)	_____	_____	_____
2)	_____	_____	_____
3)	_____	_____	_____
4)	_____	_____	_____
5)	_____	_____	_____
6)	_____	_____	_____
7)	_____	_____	_____
8)	_____	_____	_____
9)	_____	_____	_____
10)	_____	_____	_____
11)	_____	_____	_____

B. Submittals required to begin work:

	<u>Item</u>	<u>Submittal No.</u>	<u>Action Code</u>
1)	_____	_____	_____
2)	_____	_____	_____
3)	_____	_____	_____
4)	_____	_____	_____
5)	_____	_____	_____
6)	_____	_____	_____
7)	_____	_____	_____
8)	_____	_____	_____

FORM 10-2

**PREPARATORY INSPECTION CHECKLIST
(PART I)**

C. Equipment to be used in executing work:

- 1) _____
- 2) _____
- 3) _____
- 4) _____
- 5) _____

D. Work areas examined to ascertain that all preliminary work has been completed:

E. Methods and procedures for performing Quality Control, including specific testing requirements:

The above methods and procedures have been identified from the project plans and will be performed as specified for the Definable Feature of Work.

Contractor Quality Control Systems Manager

PREPARATORY INSPECTION CHECKLIST (PART II)

-
- This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

UXOQCS

3

FORM 10-3
INITIAL PHASE CHECK LIST

Contract No.: N62470-02-D-3052/CTO-0047

Date: _____

Title and No. of Technical Section: _____

Description and Location of Work Inspected: _____

A. Key Personnel Present:

	<u>Name</u>	<u>Position</u>	<u>Company</u>
1)	_____	_____	_____
2)	_____	_____	_____
3)	_____	_____	_____
4)	_____	_____	_____
5)	_____	_____	_____

B. Materials being used are in strict compliance with the contract plans and specifications: Yes ____ No ____

If not, explain: _____

C. Procedures and/or work methods witnessed are in strict compliance with the contract specifications: Yes ____ No ____

If not, explain: _____

D. Workmanship is acceptable: Yes ____ No ____

State where improvement is needed: _____

E. Workmanship is free of safety violations: Yes ____ No ____

If no, corrective action taken: _____

FORM 10-4

FOLLOW UP CHECKLIST

Date:

Contractor:

Contract No: N62470-02-D-3052/CTO-0047

Y=YES; N=NO; SEE REMARKS BLANK=NOT APPLICABLE	
WORK COMPLIES WITH CONTRACT AS APPROVED IN INITIAL PHASE	

IDENTIFY DEFINABLE FEATURE OF WORK, LOCATION, AND LIST PERSONNEL PRESENT

TESTING PERFORMED & WHO PERFORMED TEST (Include number of samples and/or tests taken)

QA Representative

Date

UXOQCS

Date

FORM 10-5

FINAL INSPECTION CHECKLIST (PART I)

Date: _____

Project / Area of Inspection:

Status of Inspection:

I hereby certify, that to the best of my knowledge and belief, that the work inspected is complete and all materials and equipment used and work performed were completed in accordance with plans submitted and approved.

B. Final Acceptance is Approved, Subject to the Correction of the Punchlist Items Below:

1

FINAL INSPECTION CHECKLIST (PART I) (CONTINUED)

-
- This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

UXOQCS

2

FORM 10-5

**FINAL INSPECTION CHECKLIST
(PART II)**

MEETING ATTENDANCE LIST

Meeting:		Date:
Name	Organization	Phone Number

FORM 10-6

INSPECTION SCHEDULE AND TRACKING FORM

Project: N62470-02-D-3052/CTO-0047	Project Manager:	UXOQCS:
------------------------------------	------------------	---------

Reference Number	Definable Feature of Work	Preparatory		Initial		Follow-Up		Completion		
		Date Planned	Actual Date	Date Planned	Actual Date	Planned Begin/End	Actual Dates	Planned Begin/End	Actual Dates	Status

DOCUMENT REVIEW AND RELEASE FORM

Client:		Author:		Submittal Register Item No.:			Date:	
Document Title:					Revision:		D.O.#	
Reviewer (<i>print</i>)	Reviewer initial & date	Technical	Project Manager	CQC System Mgr.	Health & Safety	Editorial	Chemistry	Construction
Reviewer Comments Resolved (<i>Signature & Date</i>)								
Same as Technical Reviewer Above		X	Topic outline with objectives for each section submitted prior to Rev. A					
<i>Program Reviewer's Acceptance for Document Submittal</i>							Signature	Yes
1) A 4025 (as applicable) prepared and submitted with document?								No
2) Technical Conclusions adequately supported by text and data?								
3) Tables and Figures are in the proper format and checked and approved?								
4) The Table of Contents consistent with text information?								
5) Technical Reviewers are qualified and accepted by Technical Manager?								
6) A document Distribution List been prepared and submitted with document?								

Approval:

Project Manager

Approval:

UXOQCS

(1) Page 1 of 2

(2) CAR #:	(3) PRIORITY: <input type="checkbox"/> HIGH <input type="checkbox"/> NORMAL	(4) DATE PREPARED:
------------	---	--------------------

PART A: NOTICE OF DEFICIENCY

(5) PROJECT:	
(6) PROJECT MANAGER:	(7) UXOQCS:
(8) WORK UNIT:	(9) WORK UNIT MANAGER:
(10) ISSUED TO (INDIVIDUAL & ORGANIZATION):	
(11) REQUIREMENT & REFERENCE:	
(12) PROBLEM DESCRIPTION & LOCATION:	
(13) CAP REQUIRED? <input type="checkbox"/> YES <input type="checkbox"/> NO	(14) RESPONSE DUE:
(15) ISSUED BY (PRINTED NAME & TITLE): SIGNATURE: _____ DATE: _____	(16) MANAGEMENT CONCURRENCE:

PART B: CORRECTIVE ACTION

(17) PROPOSED CORRECTIVE ACTION/ACTION TAKEN:	
NOTE: SUPPORTING DOCUMENTATION MUST BE LISTED ON THE BACK OF THIS FORM AND ATTACHED.	
(18) PART B COMPLETED BY (NAME & TITLE): SIGNATURE: _____ DATE: _____	(19) QC CONCURRENCE: _____

PART C: CORRECTIVE ACTION VERIFICATION

(20) CAR VERIFICATION AND CLOSE-OUT: (CHECK ONLY ONE & EXPLAIN STIPULATIONS, IF ANY)

☐ APPROVED FOR CLOSURE WITHOUT STIPULATIONS

☐ APPROVED FOR CLOSURE WITH FOLLOWING STIPULATIONS

COMMENTS/STIPULATIONS:

(21) CLOSED BY (PRINTED NAME & TITLE):

SIGNATURE: _____ DATE: _____

- (1) **UXOQCS:** Verify that the total number of pages includes all attachments.
- (2) **UXOQCS:** Fill in CAR number from CAR log.
- (3) **UXOQCS:** Fill in appropriate priority category. **High** priority indicates resolution of deficiency requires expediting corrective action plan and correction of deficient conditions noted in the CAR and extraordinary resources may be required due to the deficiency's impact on continuing operations. **Normal** priority indicates that the deficiency resolution process may be accomplished without further impacting continuing operations.
- (4) **CAR Requestor:** Fill in date CAR is initiated.
- (5) **CAR Requestor:** Identify project name, number, CTO, and WAD.
- (6) **CAR Requestor:** Identify Project Manager
- (7) **CAR Requestor:** Identify CQC System Manager.
- (8) **CAR Requestor:** Identify project organization, group, or discrete work environment where deficiency was first discovered.
- (9) **CAR Requestor:** Identify line manager responsible for work unit where deficiency was discovered.
- (10) **UXOQCS:** Identify responsible manager designated to resolve deficiency (this may not be work unit manager).
- (11) **CAR Requestor:** Identify source of requirement violated in contract, work planning document, procedure, instruction, etc; use exact reference to page and, when applicable, paragraph.
- (12) **CAR Requestor:** Identify problem as it relates to requirement previously stated. Identify location of work activities impacted by deficiency.
- (13) **UXOQCS:** Identify if Corrective Action Plan (CAP) is required. CAP is typically required where one or more of the following conditions apply: CAR priority is **High**; deficiency requires a rigorous corrective action planning process to identify similar work product or activities affected by the deficiency; or deficiency requires extensive resources and planning to correct the deficiency and to prevent future recurrence.
- (14) **UXOQCS:** Identify date by which proposed corrective action is due to QC for concurrence.
- (15) **UXOQCS:** Sign and date CAR and forward to responsible manager identified in (10) above.
- (16) **Responsible Manager:** Initial to acknowledge receipt of CAR.
- (17) **Responsible Manager:** Complete corrective action plan and identify date of correction. Typical corrective action response will include statement regarding how the condition occurred, what the extent of the problem is (if not readily apparent by the problem description statement in [12]), methods to be used to correct the condition, and actions to be taken to prevent the condition from recurring. If a CAP is required, refer to CAP only in this section.
- (18) **Responsible Manager:** Sign and date corrective action response.
- (19) **UXOQCS:** Initial to identify concurrence with corrective action response from responsible manager.
- (20) **UXOQCS:** Check appropriate block to identify if corrective action process is complete so that CAR may be closed. Add close-out comments relevant to block checked.
- (21) **UXOQCS:** Indicate document closeout by signing and dating.

CORRECTIVE ACTION PLAN

Attach clarifications and additional information as needed. Identify attached material in appropriate section of this form.

PART A: TO BE COMPLETED BY PROJECT MANAGER OR DESIGNEE

(1) PROJECT:		
(2) PROJECT MANAGER:	(3) UXOQCS:	
(4) CAR NO(S) AND DATE(S) ISSUED:		
(5) DEFICIENCY DESCRIPTION AND LOCATION:		
(6) PLANNED ACTIONS	(7) ASSIGNED RESPONSIBILITY	(8) COMPLETION DUE DATE
(9) PROJECT MANAGER SIGNATURE: _____ DATE: _____		

PART B: TO BE COMPLETED BY UXOQCS OR DESIGNEE

(10) CAP REVIEWED BY: _____	DATE: _____
(11) REVIEWER COMMENTS:	
(12) CAP DISPOSITION: (CHECK ONLY ONE AND EXPLAIN STIPULATIONS, IF ANY) <input type="checkbox"/> APPROVED WITHOUT STIPULATIONS <input type="checkbox"/> APPROVED WITH STIPULATIONS <input type="checkbox"/> APPROVAL DELAYED, FURTHER PLANNING REQUIRED COMMENTS:	
(13) UXOQCS SIGNATURE: _____	DATE: _____

Form 10-10
Weekly Quality Control Report

Contract: N62470-02-D-3052/CTO-0047

Date: _____
Report No: _____

LOCATION OF WORK: _____

DESCRIPTION: _____

WEATHER: (CLEAR) (FOG) (P.CLOUDY) (RAIN) (WINDY)

TEMPERATURE: MIN ____ °F MAX ____ °F

1. Work performed today:

2. Work performed today by Removal Action subcontractor(s):

3. Preparatory Phase Inspections performed today (include personnel present, specification section, drawings, plans, and submittals required for definable feature of work):

4. Initial phase Inspections performed today (include personnel present, workmanship standard established, material certifications/ test are completed, plans and drawings are reviewed):

5. Follow-up Phase Inspections performed today (include locations, feature of work and level of compliance with plans and procedures):

Form 10-10
Weekly Quality Control Report (Continued)

6. List tests performed, samples collected, and results received:

7. Verbal instructions received (instructions given by Government representative and actions taken):

8. Non-conformances/ deficiencies reported:

9. Site safety monitoring activities performed today:

10. Remarks:

CERTIFICATION: I certify that the above report is complete and correct and that I, or my representative, have inspected all work identified on this report performed by _____ subcontractor(s) and have determined to the best of my knowledge and belief that noted work activities are in compliance with the plans and specifications, except as may be noted above.

UXOQCS (or designee) Signature: _____

Environmental Protection Plan

11.1 Endangered/Threatened Species within the Project Site

A final ecological study and habitat characterization of the Former VNTR is pending. No threatened or endangered plant or animal species are expected to be impacted by the proposed MEC work in this scope of work. The results of the ecological study will be carefully reviewed to ensure MEC work does not adversely effect any endangered/threatened species. All ecological issues will first be addressed with the USFWS Refuge Manager and following contact with USFWS it will be determined if other agencies support will be needed.

Tables 11-1 and 11-2 list the federally protected plant and animal species that are known to occur or that have the potential to occur on Vieques.

TABLE 11-1

Rare and Endangered Terrestrial Plant Species at VNTR
Vieques, Puerto Rico

Name	Growth Form	Habitat
Amaranthaceae <i>Celiosia virgata</i>	Herb	Upland Forest
Bignoniaceae <i>Enallagma latifolia</i>	Tree	Lowland Forest
Bromeliaceae <i>Tillandsia lineatispica</i>	Epiphyte	Lowland Forest
<i>Witmackia lingulata</i>	Epiphyte	Lowland Forest
Caesalpiniaceae <i>Caesalpinia bunduc</i>	Tree	Beach Scrub
<i>Stahlia monosperma</i> *	Tree	Lowland Forest
Capparidaceae <i>Morisonia americana</i>	Tree	Upland Forest
Celastraceae <i>Maytenus cymosa</i>	Shrub	Lowland Forest
Compositae <i>Baccharis dioica</i>	Sedge	Evergreen Scrub
Cyperaceae <i>Bulbostylis pauciflora</i>	Sedge	Pastures
<i>Cyperus urbani</i>	Tree	Pastures
Flacourtiaceae <i>Prockia cruiz</i>	Tree	Upland Forest
Malpighiaceae <i>Malpighia fucata</i> *	Tree	Beach Scrub
<i>M. infectissima</i>	Tree	Beach Scrub
<i>M. linearis</i> *	Tree	Beach Scrub
<i>M. shaferi</i>	Tree	Lowland Forest
<i>Tetrapteris inaequalis</i>	Woody Vine	Beach Scrub
Myrtaceae <i>Calyptanthes thomasiana</i>	Tree	Upland Forest

TABLE 11-1
Rare and Endangered Terrestrial Plant Species at VNTR
Vieques, Puerto Rico

Name	Growth Form	Habitat
Olcaceae <i>Schoepfia schreberi</i>	Tree	Upland Forest
Orchidaceae <i>Epidendrum bifidum</i>	Epiphyte	Evergreen Scrub
Papilionaceae <i>Sophora tomentosa</i>	Scrub	Beach Scrub
Piperaceae <i>Peperomia myrtifolia</i>	Herb	Upland Forest
Polypodiaceae <i>Adiantum villosum</i>	Fern	Gallery Forest
Solanaceae <i>Brunfelsia americana</i>	Tree	Upland Forest
Urticaceae <i>Pouzolzia occidentalis</i>	Shrub	Upland Forest
Zygophyllaceae <i>Guaiaecum officinale</i>	Tree	Beach Scrub

*Observed during Environmental Impact Study (Tamsand Ecology and Environment, Inc., 1980)

Source: Wodbury, Roy, et al., 1975, Rare and Endangered Plants of Puerto Rico, a Committee Report, U.S. Department of Agriculture, Soil Conservation Service.

TABLE 11-2
Rare and Endangered Terrestrial and Amphibious Wildlife at VNTR
Vieques, Puerto Rico

Species	Common Name	Status
<i>Sphaerodactylus roosevelti</i> * ^o	Littoral Lizard	Rare
<i>Anolis cuvieri</i> * ^o	Puerto Rican Giant Anole	Rare or Extinct
<i>Mabuya sloanii</i> * ^o	Slippery Black Skink	Rare or Extinct
<i>Typhlops</i> ^o	Worm Snake	Rare
<i>Alsophis antillensis</i> ^o	Ground Snake	Rare or Extinct
<i>Pseudemys rternegeri</i> * ^o	Antillean Painted Turtle	Rare
<i>Chelonia mydas</i> * ^o	Green Sea Turtle	Endangered
<i>Dermochelys coriacea</i> * ^o	Leatherback (Sea Turtle)	Endangered
<i>Caretta caretta</i> * ^o	Loggerhead (Sea Turtle)	Endangered
<i>Eretmochelys imbricata</i> * ^o	Hawksbill (Sea Turtle)	Endangered
<i>Trimeresurus</i>	Fer-De-Lance	Rare or Extinct

* = Endangered in Puerto Rico

* = Federally classified endangered species

^o = Not observed during study

Source: Ecology and Environment, Inc., 1978

All of the federally protected sea turtle species listed in Table 11-2 have the potential to utilize the marine environment near the beach area and also the shoreline during nesting. Sea turtle nesting may occur from March through November. No sea turtle nesting areas are within the areas described in this scope of work for removal action. However, all project personnel will be instructed to avoid sea turtles or sea turtle nests that are encountered. All sea turtle nests that are located will be marked by flagging during the duration of the project to prevent potential impacts. All sea turtle tracks sighted within the project area will be reported to the project manager and the USFWS Refuge Manager.

All of the federally protected bird species listed in Table 11-2 have the potential to utilize the project area for foraging, particularly the brown pelican and roseate tern. None of these bird species are expected to use the project area for nesting; therefore, their potential presence would be transitory. Because of the nature of the proposed work, no impacts to these bird species are expected.

All of the federally protected marine mammal species listed in Table 11-2 have the potential to occur in the marine environment near Former VNTR. Because the proposed work does not extend seaward of the shoreline, none of the work activities will impact these or other marine species.

11.2 Wetlands within the Project Site

No onsite wetlands are expected to be impacted by the project. In the event that wetlands are to be impacted, the USFWS Refuge Manager will be contacted. In such a case, mitigation measures will be taken to reduce the impact on the wetland ecosystem.

11.3 Cultural and Archaeological Resources within the Project Site

Based on available data, the probability that significant cultural or archaeological resources are located within the project area appears low. Because of the nature of the proposed work, any cultural or archaeological resources that may exist within the project area are not expected to be impacted. If any cultural or archaeological materials or resources are discovered within the project area, a qualified archaeologist will be notified and will provide guidance on performing further work in the area. Cultural and archaeological issues will be addressed by contacting the State Historic Preservation Office (SHPO; 787-721-3737). A review/training of potential archeological items that may be present will be conducted for all personnel to assist with identifying items if encountered.

11.4 Water Resources within the Project Site

Based on available aerial photography, no water resources appear to be located within the project area, except for the Caribbean Sea to the north, south, and east and several lagoons spread along the coast. No water resources are expected to be impacted by the project.

11.5 Coastal Zones within the Project Site

The entire northern, southern, and eastern sides of the project area are coastal zones (Caribbean Sea). No work is proposed seaward of the mean high tide boundary along the coastline. Because of the nature of the proposed work, the marine environment seaward of the shoreline and the areas landward of the shoreline are not expected to be impacted.

11.6 Trees and Shrubs to be Removed within the Project Site

The proposed work will involve removal of shrubs, undergrowth, and small trees within the project area. The vegetation will be removed only on an as-needed basis. No large trees greater than 3 inches diameter at breast height (DBH) will be removed as part of the study and removal.

11.7 Compliance with ARARS

Removal Action Contractor will follow all applicable regulations and obtain all necessary permits concerning environmental protection, pollution control, and abatement necessary for the proposed project work. Table 11-3 lists the applicable regulations and requirements for environmental protection. Other ARARs to be followed are presented in Section 2.

TABLE 11-3
ARARs for Environmental Protection

Reference	Title
Federal Requirements	
16 USC 1531 et seq., per 50 CFR 402	Endangered Species Act
16 USC 703, et seq.	Migratory Bird Treaty Act
16 USC 469, et seq., and 36 CFR 65	National Archaeological and Historic Preservation Act

11.8 Detail Procedures and Methods to Protect and/or Mitigate the Resources/Sites Identified

Prior to initiation of the proposed work, a general survey of the project area will be conducted by a qualified ecologist to identify any obvious environmental concerns. The ecologist, in conjunction with the project manager, will provide instructions to field personnel regarding the protection of onsite environmental resources. Such protective measures will include, but are not limited to, the following:

- Avoid contact with any specimen of the Cobana negra tree or any other federally protected plant that is found within the project area. Flag specimens within the project area for easy identification.
- Avoid any sea turtles or sea turtle nests that are encountered. All sea turtle nests that are located will be marked by flagging during the duration of the project to prevent

potential impacts. All sea turtle tracks sighted within the project area will be reported to the project manager.

- Any MEC found within or near a wetland will be identified and removed, if deemed safe to do so, without impacts to wetland soil, vegetation, or hydrology.
- If any cultural or archaeological material/ resource is discovered within the project area, a qualified archaeologist will be notified to provide guidance on performing further work in the area.
- Any MEC found in the immediate vicinity of a water body will be identified and removed, if deemed safe to do so, without impacts to the water resource.
- Any MEC found near the coastal zone will be identified and removed, if deemed safe to do so, without impacts to the coastal environment.

The Project Manager will seek the guidance of the qualified ecologist to determine appropriate mitigation measures in the event that the performed work activities result in impacts to any environmental resource.

Investigation Derived Waste Plan

This IDW Management Plan describes the handling of materials during MEC removal and HTRW activities, and was developed in accordance with NAVSEA OP5, Ammunition and Explosives Ashore: Safety Regulations for Handling, Storing, Production, Renovation, and Shipping and DoD 4160.21-M, Defense Reutilization and Marketing Manual. General IDW procedures for environmental investigations at Former VNTR were addressed in the *Final Master Work Plan Atlantic Fleet Weapons Training Facility, Vieques Island, Puerto Rico* (CH2M HILL, June 12, 2003).

12.1 Objective

The primary objective of this plan is to identify when material removed requires special management as IDW.

12.2 Types of Potential IDW and Planned Disposition

During this removal action, media most likely encountered will be soil removed while excavating MEC MPPEH, and non-hazardous scrap. No hazardous waste, liquid waste, or CWM is expected to be encountered.

IDW will be segregated, inventoried, demilitarized (if required) and disposed of. The following paragraphs outline the planned procedures for dealing with materials excavated or uncovered.

12.3 Non-Hazardous Debris Disposal

The following procedures apply to non-hazardous scrap or debris removed from the sites:

- Economically recyclable debris (such as scrap metal) will be collected and delivered to an appropriate local recycling facility. Recycling will be coordinated with the Navy.
- Non-MEC debris will be accounted for in estimated pounds recovered and type of material, and then shipped offsite.
- Vegetative debris will be mulched and left onsite as ground cover. This will reduce soil erosion from the brush clearing activities.
- Non-recyclable and other debris, such as concrete and asphalt rubble, tires, plastic, wood, PPE, and metal that is not considered recyclable will be placed at the Vieques Landfill as part of the general fill as required.

12.4 Disposition of Material Potentially Presenting an Explosive Hazard (MPPEH)/Munitions Debris (MD)

Procedures for disposal of MPPEH/MD, are addressed in Section 2 and Attachment 2-1, Technical Management Plan. MPPEH/MD materials will be evaluated as indicated below.

- Treatment of MMPEH/MD waste will require an Emergency RCRA Permit (40 CFR 270.61) which will be valid for up to a 90 day period. Any treatment extending for more than 90 days will require an additional permit(s).
- MPPEH/MD that have been in direct contact with energetic materials of the ordnance (e.g., expended rocket motors, shell casings, and warhead fragments) will be visually inspected by UXO personnel, and will be certified (3-X) as described in Section 2.7.3.
- Certified-safe MEC wastes will be containerized on-site and sent to an authorized recycle facility that is on the qualified recycling program (QRP). The MMPEH/MD waste can be stored on-site for up to 270 days. Storage past this time period will require a RCRA Permit.
- MEC materials recovered in the remote areas will require inspection, demilitarization, certification, verification, and will be consolidated on-range if determined not to present any explosive safety hazards.
- Materials that cannot be certified as safe from explosive hazards will be handled, stored, transported, and disposed of as MPPEH by MRP Contractor.
- MPPEH/MD must be demilitarized to a point that they are not recognizable as hazardous ordnance.

12.5 Clearing and Grubbing

Vegetation that may interfere with the MEC or HTRW activity will be removed, as required, according to Section 2. Brush, grass, roots, and stumps, along with other debris that may be grubbed before implementing the activity, will be left onsite as mulched material.

12.6 Contaminated Soil and Hazardous Waste

If unexpected contaminated soil and/or hazardous waste is encountered during MEC activities, the SUXOS, UXO Safety Specialist, and UXOSO will be notified immediately and all site activities will stop if necessary. The Project Manager, in coordination with the Navy and appropriate regulatory agencies, will develop appropriate removal and disposal procedures.

12.7 Transportation

Non-MEC related debris, vegetation, and contaminated soil will be transported to the Vieques Landfill or to the appropriate recycling facility for final disposition. A spill patrol

will be implemented to monitor the transport route and pick up spills that may occur from the haul trucks.

The vegetation, soil, and other non-recyclable debris will be placed in the general fill by spreading with a bulldozer in thin lifts. The soil may also be used as foundation for the landfill cover provided that it meets the following specification:

- Soil used in the upper 6-inch zone of the foundation layer will be, to the extent practicable, free of rocks greater than 0.5 inch. The soil will not contain materials that could be deleterious to the geomembrane.

A UXO technician will observe the soil as it is being spread out. The location of the soil in the landfill will be surveyed.

Transport of encountered MEC-related material, including UXO, will be in accordance with Section 2.

Geographical Information System Plan

This GIS Plan describes the incorporation of GIS into the data management phases of MEC anomaly validation actions at the Former VNTR. This plan was developed in accordance with MMRP MCX data item description (DID) OE-005-14.01.

The comprehensive MEC-GIS and associated database will be established to track and manage the data generated during the course of MEC investigations and the disposition of MPPEH/MD and detonated MEC. The hardware and software tools to be used have been specifically chosen to provide a flexible system that allows effective and timely data management, long-term storage and archival of data, and expansion of the database to include new information that can readily be integrated into the existing database as appropriate. The database and GIS are also designed to be transportable to existing project applications developed and maintained by other members of the Vieques project team. This will provide an efficient mechanism for retrieving MEC -related information for technical evaluation, removal efforts, reporting, and ultimately to assist in the efficient transfer and reuse of parcels at the Former VNTR.

The data will be managed using the CADD/GIS Technology Center SDS as outlined in SDS/Facility Management Standards (FMS) release 1.95 where applicable. The intent of SDS is to provide data in an accessible and predictable format that can be used by standard, readily available GIS software applications.

13.1 Geographical Information System Incorporation

The purpose of this task is to leverage GIS technology to effectively manage and integrate MEC-related data collected as part of the ongoing investigations being conducted in Vieques. When properly set up, GIS applications can integrate spatial data (maps) with tabulated data stored in databases (such as MEC type, location, and status).

Significant amounts of background and location data collected during the various investigations that have been conducted or are currently being conducted are already integrated into a GIS for the site. The intent of this GIS is to leverage existing systems that have already been developed for the Navy so that the GIS can be integrated to meet the needs of MEC investigations and ultimately assist with making decisions regarding future reuse of parcels.

A comprehensive database, Arc/INFO, ArcView MEC-GIS will be developed to manage, evaluate, and report site information. The MEC-GIS system will be based on the current environmental system for Vieques and will incorporate additional data for MEC investigation, ordnance tracking, reporting, and decision support systems. Where applicable, additional data such as geology, hydrogeology, and infrastructure will be incorporated to assist in the investigation. Attribute data are to be stored in a relational database that is inherently linked to the spatial data through the GIS interface. Spatial data identifying elements such as buildings are managed in Arc/INFO and archive. The

Arc/INFO and ArcView GIS is integrated with the database and is used to perform spatial analyses of the various attribute and spatial data. All existing data is currently referenced to the 1983 NAD 83, UTM coordinate system.

Widely used, commercially available hardware and software will be utilized in the development and maintenance of the MEC database and GIS. No proprietary software will be used to prepare these applications. Tools developed for interim analysis will be documented and may be evaluated by the Navy. This ensures that data will be readily accessible by all members of the project team authorized to use these data. This also ensures that the data is portable should it be necessary to transfer the GIS and associated database to other servers and workstations.

A computer system will be available onsite (at Vieques) for GIS data entry, management, and reporting. The Contractor will provide GIS and database support on an as-needed basis to assist with GIS system functionality and use.

The existing Vieques GIS has been developed in the ArcView GIS environment. ArcView GIS will be the primary GIS software for all GIS data management and mapping. The Microsoft Office 97 suite of programs (including Microsoft Access, Microsoft Word, Microsoft Project, and Microsoft Excel) and AutoCAD (Release 14 or 2000) will also be used on this project, where applicable.

Title II Services Contractor will establish a MicroStation 95 data file. All MEC-related files will be made available in a format that is compatible with Navy format. These may include (but are not limited to) ArcView shapefiles, Microstation DGN files, comma delimited ASCII data files, files, dBase (.dbf) format files, or Access databases, depending on the specific needs of the deliverable.

Microsoft Access 97 will be the primary database software used to manage MEC data. The database will include a database schema, electronic data entry functions, QA/QC reporting audits of the data, data management, and a link to the spatial data supporting the site-wide GIS. The site-wide relational database will be stored in Microsoft Access 97 at this time. These database tables and relationships will be compatible for transfer of the data to an Oracle platform in the future if requested by the Navy.

All field data collected as part of the removal actions will be managed in and integrated with the site-wide relational database. The data fields in field forms and field data collection equipment will be formatted to be consistent with the data fields used in the database. Anomaly data will be collected using a real-time data collection process that will generate a raw data file consisting of values for easting, northing, and geophysical value. Naming conventions will be developed so that all field observations and measurements are consistent. Attributes specific to the MEC investigation will be stored and managed in tables separate from other database tables (such as environmental or endangered species related data). Several types of information that will be used to join tables include:

- Site name–Common name used to identify the study area.
- Munitions Response Site number assigned to each study area.
- Grid number–Unique number of sampling grid where MEC was observed.

- Identification number—Unique identification number assigned by the field team to each observation, MEC component, or explosion pit.

MEC spatial data will be entered into the database as point data identified by a unique northing and easting coordinate pair (a unique point designator will also be assigned). In the event that multiple MEC items encountered in the field are grouped and classified as a cluster, the cluster location will be entered into the GIS as a single point. A field in the MEC point attribute table will identify such clusters. A separate table with unique MEC item records will be developed (and linked to the point location layer) that will be used to track the item through the project life cycle. Attribute data will be related to the MEC point layer to provide a detailed description of the cluster as appropriate.

MEC item attribute data includes both qualitative and quantitative sample information such as ordnance type, quantity, and status. In addition, a munitions database can be linked to the MEC item table to provide physical, chemical, and explosive data regarding each MEC or MEC item found in the field. This anomaly validation study will not require the use of various models for evaluation of buried explosives, trajectory, and other assessments related to the unintentional detonation of munitions. If required (as a result of field conditions), this analysis will be scoped in a separate task.

The workflow for transferring the field data to the database is summarized below:

1. Field observations are recorded either on pre-defined field forms or electronically (laptop/palmtop system). Electronic data collection systems will have predefined data dictionaries with drop-down boxes to simplify and standardize recording of field data.
2. Data from the geophysical survey will be processed by the field team leader daily, and the processed files will be submitted to the project data manager for QA and incorporation into the standard data management structure. Each file will be stored in original format and converted to the standard GIS or database format to be included in the system.
3. At the end of the field day, data on field forms are verified for completeness and accuracy (i.e., number of observations made match the number of observations recorded). Copies of the field forms are made and hard copies of the electronic forms are printed for the field office.
4. Data from field forms are entered into MEC database loading tables (either onsite or transmitted to a local office for data entry). These tables are then loaded into the MEC GIS and database. Electronic forms are processed onsite and loaded directly into the MEC database.
5. QC checks of the data will be based on a set of reports that will be generated from the database and provided to the project manager and field team leader for review. For example, the ordnance type information cannot be entered unless an ordnance sampling location has been properly defined.
6. After data tables are loaded, the database is ready for use at the site for data analysis and reporting, uploading to the onsite GIS, generation of field maps, or transfer and uploading to the Vieques site-wide database.

When required for field data collection, data entry fields on the paper and electronic forms will match the field names in the MEC database. This will allow the project team to track the flow of MEC information from data collection through processing, analysis, storage, and archival.

The MEC database will also be used to store and track inventory information related to the anomaly investigation. If MEC is moved and detonated onsite, this information will also be included in the GIS/database system.

Additional data will be incorporated as necessary into the onsite GIS as layers. These layers consist of pre-existing data, or other non-MEC data collected during the MEC investigation. Sources for such data include existing CAD files, published data, and output from other software applications. Examples of these layers include existing anomaly data, and spatial and attribute data collected and mapped by previous investigators, if available.

The GIS will not be used to store all raw data generated during the MEC investigations. For example, data points collected by geophysical instruments, gridded data used by modeling programs to generate contour maps, and similar types of backup data will likely be archived as separate tables in the database or as independent databases. An attribute field will be added to the GIS coverage that identifies a file location or similar reference to document these data. The interpreted results of analysis (such as interpreted geophysical results), however, will be included in the GIS.

13.2 Computer Files

All data, text, and digital maps will be available in standard file formats. Text will be delivered in either Microsoft Word 97 or Adobe Acrobat Portable Document Format (PDF), as requested in the specific project task order. The shareware PDF viewer will be provided along with the PDF documents.

All GIS and associated database and digitized aerial photographs are transportable and can be copied to portable media for archiving or transfer to other team members. Available formats include CD-ROM (the preferred method), digital tape, or 3.5-inch floppy diskettes. The media used is dictated in part by the sizes of the files. All survey coordinates will be stored as part of the site-wide relational database.

References

Baker Environmental Group. *Results of Hydrogeologic Investigation, Vieques Island, Puerto Rico*. November 1999.

CH2M HILL, Inc. *Final Master Work Plan, Atlantic Fleet Weapons Training Facility, Vieques Island, Puerto Rico*. June 12, 2003.

CEHNC. *Basic Safety Concepts and Considerations for MEC Operations, Engineering Pamphlet (EP) 385-1-95a*. rev. June 16, 2003.

Ecology and Environment, Inc. *Environmental Assessment of the Continued Use of the Atlantic Fleet Weapons Training Facility*. January 1986.

Tippetts, Abbott, McCarthy, Stratton, and Ecology and Environment. *Department of the Navy Environmental Impact Statement, Continued Use of the AFWTF Inner Range (Vieques)*. 1979.

U.S. Army Manual, *Explosive Ordnance Disposal Service and Unit Operations*, May 8, 1996.

U.S. Department of Agriculture (USDA) Soil Conservation Services in conjunction with the University of Puerto Rico, *Soil Survey of Humacao Area, Eastern Puerto Rico*. January 1977.

U.S. Department of Defense. *Test Method Standard, MIL-STD-1916*. April 1, 1996.

U.S. Department of Defense. *Companion Document to MIL-STD-1916, MIL-HDBK-1916*. February 10, 1999.

Woodbury, Roy, et al. *Rare and Endangered Plants of Puerto Rico, a Committee Report*, U.S. Department of Agriculture, Soil Conservation Service. 1975.

[Vargas] U.S. Geological Survey. *Water Wells on Isla De Vieques, Puerto Rico*. 1995

Appendix A
Site Specific Health and Safety Plan

Site Safety and Health Plan

This site Safety and Health Plan is intended for reference by field personnel during implementation of MEC removal action activities at the former VNTR. The Navy Occupational Safety and Health Manual, OPNAVINST 5100.23E, will be referenced as necessary during implementation of field activities.

This Site Safety and Health Plan will be kept onsite during field activities and will be reviewed as necessary. The plan will be amended or revised as project activities or conditions change or when supplemental information becomes available. In addition, this plan adopts procedures in the project Work Plan. The Site Safety Coordinator (SSC) is to be familiar with the procedures and the contents of this plan.

A.1 Project Information and Description

Client: U.S. Navy/Naval Facilities Engineering Command Atlantic

Project/Site Name: Time Critical Removal Action Former Vieques Naval Training Range

Site Address: Vieques, Puerto Rico

Date Health and Safety Plan Prepared: March 2005

Date(s) of Site Work: March to November 2005.

Site Access: All investigation sites are located in the Former Vieques Naval Training Range, in the eastern portion of Vieques Island, Puerto Rico. All Sites are accessed through the secure gate of the Former VNTR.

Site Size: 450 Acres

A.1.1 Site Topography

The topography of Vieques is characterized by gentle to steep rolling hills and valleys throughout the island, with the eastern side of the island exhibiting a more rugged terrain. The LIA is relatively flat with elevations ranging from 0 to approximately 50 feet above sea level. Cerro Matias, located within the SIA as OP-1 (Figure 1-2) is the highest point on VNTR, at approximately 420 ft above MSL. The average elevation across Vieques is approximately 246 ft MSL. The coastal area is relatively narrow; however, the southern coast exhibits wider expanses of beach.

A.1.2 Prevailing Weather

The climate of Vieques is characterized as warm and humid (tropical-marine), with frequent showers occurring throughout the year. The temperature on Vieques is affected by the easterly trade winds blowing across the island year-round. This wind moderates the temperature throughout the year, causing an annual mean temperature of 79°F to 80°F, and a

mean daily temperature range of 15°F to 25°F. The average annual rainfall on the island is approximately 36 inches, with extremes of 25 inches in the east and 45 to 50 inches in the west.

A.1.3 Site Description and History

Vieques is the largest offshore island of Puerto Rico, with a surface area of approximately 51 square miles. It is located approximately 7 miles east-southeast of the eastern end of the main island of Puerto Rico. The Navy owned portions of Vieques from 1941 until 2003. Although the Island of Culebra was the focal point for naval gunfire in the 1960s and early 1970s, AFWTF began developing facilities on the eastern end of Vieques in 1964 when it established a gunnery range in the LIA. In 1965, the Navy established a LIA, also known as the air impact area, and began construction activities at Observation Post (OP) 1 on Cerro Matias.

By the 1970s, the LIA maintained several targets for aerial bombing including old tanks and vehicles which were used as mock-ups, two bulls-eye targets and a strafing target. In addition, several point and area targets for ships to practice naval gunfire support were established in the LIA.

The Environmental Impact Statement (EIS) for Vieques (Tippetts, et al., 1979) provides a detailed discussion on the development of training facilities in the VNTR leading up to 1979. The AFWTF provided logistics support, scheduling assistance, and facilities for NGFS and ATG ordnance delivery training for Atlantic Fleet ships, NATO ships, air wings, and smaller air units from other allied nations and the Puerto Rican National Guard. The Fleet Marine Force, Atlantic (FMFLANT), conducted training for Marine amphibious units, battalion landing teams, and combat engineering units in the EMA. Occasionally, naval units of allied nations having a presence in the Caribbean and the Puerto Rican National Guard also utilized the EMA.

Adjacent to and west of the SIA, the 10,673-acre EMA provided maneuvering space and ranges for the training of marine amphibious units and battalion landing teams in exercises of amphibious landings, small arms fire, artillery and tank fire, shore fire control, and combat engineering tasks. The EMA was first established in 1947. It is demarcated by the western property line east to the western front friendly fire line where the SIA begins.

Portions of the training areas within the VNTR were in continuous use from World War II, when the Navy acquired title to the land, until 2003. The Atlantic Fleet's ships, aircraft and marine forces carried out training in all aspects of NGFS, ATG ordnance delivery, air-to-surface mine delivery, amphibious landings, small arms fire, artillery and tank fire, and combat engineering. As part of normal operations, unexploded ordnance was cleared periodically from the LIA and destroyed. The Navy also operated a waste munitions open burn and open detonation (OB/OD) facility under an EPA permit within the LIA.

A.2 Tasks to be Performed Under this Plan

A.2.1 Description of Tasks

Refer to project documents (i.e., Work Plan) for detailed task information. A risk analysis (Section A.3) has been performed for each task and is incorporated in this plan through task-

specific hazard controls and requirements for monitoring and protection. Tasks other than those listed below require an approved amendment or revision to this plan before tasks begin.

A.2.1.1 Hazwoper-Regulated Tasks

- Site Layout
- Surface geophysical surveys
 - Magnetic
 - Electromagnetic
- Vegetation removal
- MEC Removal

A.2.1.2 Non-Hazwoper-Regulated Tasks

Under specific circumstances, the training and medical monitoring requirements of federal or state Hazwoper regulations are not applicable. It must be demonstrated that the tasks can be performed without the possibility of exposure in order to use non-Hazwoper-trained personnel. Prior approval from the Health and Safety Manager (HSM) is required before these tasks are conducted on regulated hazardous waste sites.

A.3 Activity Hazard Analysis for Unexploded Ordnance Operations

Table A-1 shows hazards analysis, and Table A-2 shows inspection requirements.

TABLE A-1
Hazards Analysis

Principal Steps	Potential Hazards	Recommended Controls
Transportation of explosive materials	Accidental detonation of explosives	<p>Explosives will be transported in accordance with the 49, CFR, Parts 100-199.</p> <p>Explosives will be transported in closed vehicles whenever possible.</p> <p>When using an open vehicle, explosives will be covered with a flame resistant tarpaulin.</p> <p>Motor vehicles will be shut off when loading/unloading explosives.</p> <p>Beds of vehicles will have either a nonconductive bed liner, dunnage, or sand bags to protect the explosives from contact with the metal bed and fittings.</p> <p>Initiating explosives, such as blasting caps, will remain separated at all times from bulk explosives.</p> <p>Each vehicle used for the transport of MEC will be outfitted with a fire extinguisher and first aid kit.</p> <p>Do not fuel trucks when loaded with MEC.</p>

TABLE A-1
Hazards Analysis

Principal Steps	Potential Hazards	Recommended Controls
Transportation of explosive materials	Unqualified Drivers	Drivers operating outside the boundaries of any federal installation will be licensed in accordance with federal, state, and local regulations.
	Vehicle operations	<p>Drivers will observe all posted speed limits while operating a motor vehicle on a public roadway.</p> <p>Vehicles transporting explosives offroad will not exceed 15 miles per hour (mph).</p> <p>Chock wheels when loading or unloading MEC-related materials.</p>
Storage of explosive materials	Accidental detonation of explosives	<p>Materials will be stored in accordance with federal, state and local regulations.</p> <p>Refer to the SOP for the Storage of Explosive Materials.</p>
Surveying and establishing boundaries and grids	Accidental detonation of explosives	<p>Personnel involved will attend a site-specific MEC recognition class prior to the commencement of any site activities.</p> <p>UXO personnel will escort non-UXO-qualified personnel at all times.</p> <p>Mark and avoid MEC. Only UXO personnel will handle MEC waste.</p> <p>Check location with magnetometer prior to driving stakes.</p>
	Wildlife, slips, trips, falls, insects, poisonous plants, use of hand tools	Refer to the Activity Hazard Analysis for section of this SSHP.
Clearing and grubbing	Accidental detonation of explosives	<p>Personnel involved will attend a site-specific MEC recognition class prior to the commencement of any site activities.</p> <p>Be alert and mark all MEC located.</p> <p>Only clear and grub to within 4 inches of the ground surface.</p> <p>UXO trained personnel will escort non-UXO-qualified personnel at all times.</p> <p>Surface sweeps will be conducted with magnetometers or other suitable geophysical instrumentation to identify potential MEC.</p>
Transportation of MEC waste	Accidental detonation of explosives	No personnel allowed in cargo compartment of vehicle transporting MEC.
	Accidental detonation of explosives	<p>No MEC allowed in passenger compartment of vehicle.</p> <p>Block, brace, secure MEC.</p>

TABLE A-1
Hazards Analysis

Principal Steps	Potential Hazards	Recommended Controls
	Vehicle operations	<p>No smoking in vehicles used for transport of MEC waste.</p> <p>Placard vehicle in accordance with U.S. Department of Transportation (DOT) regulations.</p> <p>Vehicles transporting explosives offroad will not exceed 15 mph.</p> <p>Drivers will observe all posted speed limits while operating a motor vehicle on a public roadway.</p>
MEC disposal operations	Accidental detonation of explosives	Observe procedures outlined in EODB 60A-1-1-31.
MPPEH demilitarization	Accidental detonation of explosives	Only UXO technicians will perform explosive demilitarization of MPPEH.
	Shredder Operations	<p>Stay clear of moving mechanical parts.</p> <p>Ensure that only inspected scrap is fed into shredder.</p>
Inspection/certification of ORS	Accidental detonation of explosives	<p>Only UXO technicians will inspect MPPEH.</p> <p>Personnel in the immediate vicinity of MPPEH inspections will be kept to the minimum necessary for safe operations but no less than two UXO technicians.</p> <p>Observe requirements of DoD 4160.21-M-1.</p>
Anomaly reacquisition	Accidental detonation	<p>Only UXO technicians will excavate or handle MEC.</p> <p>Personnel in the immediate vicinity of MEC operations will be kept to the minimum necessary for safe operations, but no less than two UXO technicians.</p> <p>Do not subject MEC to heat, shock, or friction.</p> <p>Only hand excavation permitted when within 1 ft of MEC.</p> <p>Magnetometers will be used frequently to pinpoint the location of MEC.</p>
	Non-UXO personnel	<p>Establish exclusion zone (EZ); post warning signs, maintain site control.</p> <p>Stop all MEC operations when non-UXO-qualified personnel are within the EZ.</p>
Clearing and Grubbing of vegetation	Cutting tools, chain saws, weed cutters	<p>Eye, hand, foot, and hearing protection, (Level D). Face shield and chaps will be worn by chain saw operations. Personnel using chain saws, cutting tools, and weed cutters must provide safe distance between workers and be cautious of tools.</p>

TABLE A-1
Hazards Analysis

Principal Steps	Potential Hazards	Recommended Controls
Only the UXO subcontractor will transport MEC material and explosives.		

TABLE A-2
Inspection Requirements

Equipment to be Used	Inspection Requirements	Training Requirements
Vehicles	Daily preventive maintenance and operational checks	40-hour qualification per 29 CFR 1910.120
Fire extinguishers	First aid kits	8-hour refresher
First aid kits	Calibration of geophysical instrumentation	UXO personnel EOD trained
Demolition materials		Tailgate safety meetings
Explosives		Site-specific orientation
Blocking, bracing, and cushioning materials		Lead awareness training
Manual hand tools		Poison oak awareness training
Mechanized equipment		
EMM		
Geophysical instrumentation		
Global Positioning System instrumentation		
PPE		
Communications equipment		

A.4 Hazard Controls

This section provides safe work practices and control measures used to reduce or eliminate potential hazards. These practices and controls are to be implemented by the party in control of the site or the particular hazard. Site Personnel must remain aware of the hazards affecting them regardless of who is responsible for controlling the hazards. Site Personnel who do not understand any of these provisions should contact the SSC or UXOSO for clarification. The main physical or safety hazards posed to site personnel during project activities are described below.

A.4.1 Ordnance Explosives (OE Standards of Practice, SOP HSE-91)

OE includes MEC, Chemical Warfare Material (CWM), MEC-contaminated soils and groundwater, range maintenance, ordnance demilitarization (Demil), and demining. MEC may be encountered during field activities. Sites potentially contaminated with MEC will be screened by the UXO contractor with qualified UXO Technicians prior to and during field activities.

Site Personnel who are potentially exposed to hazards associated with MEC activities shall follow the requirements described in this section regardless of the company performing the MEC operation. Personnel knowledgeable of MEC safety precautions must observe these precautions at all times. They must also advise others in the vicinity of proper precautions for the protection of all personnel in an MEC danger area.

- Only qualified UXO Technicians will locate, identify, handle, remove, transport, store, or dispose of MEC items.
- The preferred and safest method for disposal of MEC is to destroy it in its original position by demolition (BIP) whenever circumstances permit. By this method, both the ordnance and the hazard it poses are eliminated in one operation.
- Munitions that have been determined to be "safe to move" by an authorized UXO Technician can be transported to an approved holding area or disposal site.
- One person acting alone should never conduct operations involving contact with MEC.
- MEC must not be moved or disturbed in any way unless it has been determined to be safe to do so by a qualified UXO technician. Operations in the vicinity of MEC should only be conducted after a complete work plan, including emergency procedures, has been established.
- Electronic equipment capable of emitting electromagnetic radiation (such as radios or cellular phones) shall not be activated in the vicinity of known or suspected electrically initiated ordnance.
- Munitions having no color-coding, incomplete color-coding, or improper color-coding are not uncommon, so color coding should not be relied on as a positive identification of ordnance.
- Inhalation of, and skin contact with, smoke, fumes, and vapors of explosives and related hazardous materials shall be avoided.
- MEC that has been exposed to fire or detonation must be considered extremely hazardous. Chemical and physical changes may have occurred to the contents, which render it more sensitive than when in its original state.
- When encountered, attempts should be made to positively identify MEC items. The item shall be carefully examined for markings and other identifying features such as shape, size, and external fittings. The item should not be moved prior to inspection.
- Ordnance shall be approached from the side because munitions may contain an ejection hazard, shaped charge explosive jet hazard, rocket motor, or fuzing sensitive to movement.
- Unnecessary personnel must not remain in the vicinity of MEC.
- Ordnance items must be considered armed and dangerous.
- Fired ammunition or ordnance should not be considered safe.
- Souvenirs shall not be collected.

A.4.2 Excavation

Contractors and subcontractors are responsible for providing a competent person to oversee MEC operations. A competent person may be a SUXOS, UXOSO, UXO QC Specialist, or a UXO Technician III. Occupational Safety and Health Administration (OSHA) regulations

describe a competent person as one who is capable of identifying existing and predictable hazards in the work surroundings and has the authorization to take prompt corrective measures to eliminate them.

The competent person must meet the following minimum qualification requirements:

- Be a graduate of either of one of the following: U.S. Army Bomb Disposal School, Aberdeen Proving Ground, MD; U.S. Naval EOD School, Indian Head, MD; U.S. Naval EOD School, Eglin Air Force Base, FL; EOD Assistants Course, Redstone Arsenal, AL; EOD Assistant Course at Eglin Air Force Base, FL; or a U.S. DoD-certified equivalent course.
- Have at least 10 years of combined active duty military EOD and contractor UXO experience.
- Have experience in UXO clearance operations and supervising personnel.

The requirements of this section shall be followed by site personnel who are potentially exposed to hazards associated with excavation activities, regardless of the company performing the excavation operation.

- Do not enter the excavations unless completely necessary, and only after the competent person has completed the daily inspection and has authorized entry.
- Follow all excavation entry requirements established by the competent person.
- Do not enter excavations where protective systems are damaged or unstable.
- Do not enter excavations where objects or structures above the work location may become unstable and fall into the excavation.
- Do not enter excavations that potentially contain a hazardous atmosphere until the air has been tested and found to be safe.
- Do not enter excavations with accumulated water unless precautions have been taken to prevent excavation cave-in.
- Conduct MEC avoidance during excavation on known or suspected MRAs.
- Prior to excavation crews entering any of the sites, conduct a reconnaissance and MEC avoidance activities to provide clear access routes to each site, according to the following procedures:
 - Identify and clearly mark the boundaries of a clear approach path for the sampling crews, vehicles, and equipment to enter the site. This path will be, at a minimum, twice the width of the widest vehicle. No one will be allowed outside any marked boundary.
 - If MEC is encountered on the ground surface, clearly mark the area where it is found, report it to the proper authorities, and divert the approach path around it.
 - Conduct an access survey using the appropriate geophysical instrument over the approach path for avoidance of MEC that may be in the subsurface. If a magnetic

anomaly is encountered, assume it is MEC and divert the approach path around the anomaly. Only UXO personnel will operate the appropriate geophysical instrument and identify MEC.

- After preparing the site, employ the following approaches to excavation:
 - Remember that hand excavation is the most reliable method for uncovering MEC.
 - Consider earth-moving machinery (EMM) to excavate overburden from suspect MEC. EMM will not be used to excavate within 12 inches of suspected MEC.
 - Use a step-down or offset access method for hand or EMM excavation methods.

A.4.3 General Hazards

The general physical or safety hazards posed to personnel during project activities are:

- General hazards and housekeeping
- Hazard communications
- Shipping and transportation of chemical products
- Manual lifting
- Fire prevention
- Electrical
- Ladders
- Thermal stress
- Compressed gas cylinders
- Utilities
- Working on water
- Working near water
- Slips trips and falls
- IDW drum sampling
- Confined space entry
- Working around material handling equipment
- Biological hazards and controls
- Other hazards

The health and safety control measures for these hazards are described below.

A.4.3.1 General Hazards and Housekeeping

- Site work must be performed during daylight hours whenever possible. Work conducted at night requires enough illumination intensity to read a newspaper without difficulty.
- Hearing protection must be worn in areas where shouting is necessary to hear someone within 3 ft.
- Good housekeeping must be maintained at all times in all project work areas.
- Common paths of travel must be established and kept free from the accumulation of materials.

- Aisles, exits, ladders, stairways, scaffolding, and emergency equipment must be kept free from obstructions.
- Slip-resistant surfaces, ropes, and/or other devices must be provided.
- Stairs or ladders are generally required when there is a break in elevation of 19 inches or more.
- Specific areas shall be designated for the proper storage of materials.
- Tools, equipment, materials, and supplies shall be stored in an orderly manner.
- As work progresses, scrap and unessential materials must be neatly stored or removed from the work area.
- Containers shall be provided for collecting trash and other debris and shall be removed at regular intervals.
- All spills shall be quickly cleaned up. Oil and grease shall be cleaned from walking and working surfaces.

A.4.3.2 Hazard Communication

The SSC or UXOSO is to perform the following:

- Complete an inventory of chemicals brought onsite.
- Confirm that an inventory of chemicals brought onsite by contractors and subcontractors is available.
- Request or confirm locations of Material Safety Data Sheets (MSDSs) from NAVFAC, contractors, and subcontractors for chemicals to which site personnel potentially are exposed.
- Before or as the chemicals arrive onsite, obtain an MSDS for each hazardous chemical.
- Label chemical containers with the identity of the chemical and with hazard warnings, and store properly.
- Give employees required chemical-specific HAZCOM training.

A.4.3.3 Shipping and Transportation of Chemical Products

Chemicals are not expected to be needed as part of the field efforts. If chemicals are determined to be necessary, these chemicals might be defined as hazardous materials by DOT. All staff who ship the materials or transport them by road must receive training in shipping dangerous goods. All hazardous materials that are shipped (e.g., via Federal Express) or are transported by road must be properly identified, labeled, packed, and documented by trained staff. Contact the HSM or the Equipment Coordinator for additional information.

A.4.3.4 Manual Lifting

These proper lifting techniques must be used when lifting any object:

- Plan storage and staging to minimize lifting or carrying distances.
- Split heavy loads into smaller loads.
- Use mechanical lifting aids whenever possible.
- Have someone assist with the lift, especially for heavy or awkward loads.
- Make sure the path of travel is clear prior to the lift.

A.4.3.5 Slips, Trips, and Falls

- Institute and maintain good housekeeping practices.
- Pick up tools and debris in the work area.
- Walk or climb only on equipment surfaces designed for personnel access.
- Be aware of poor footing and potential slipping and tripping hazards in the work area.

A.4.3.6 Fire Prevention

- Fire extinguishers must be provided so that the travel distance from any work area to the nearest extinguisher is less than 100 ft. When 5 gallons or more of a flammable or combustible liquid is being used, an extinguisher must be within 50 ft. Extinguishers must:
 - Be maintained in a fully charged and operable condition
 - Be visually inspected each month
 - Undergo a maintenance check each year
- The area in front of extinguishers must be kept clear.
- “Exit” signs must be posted over exiting doors, and “Fire Extinguisher” signs must be posted over extinguisher locations.
- Combustible materials stored outside should be at least 10 ft from any building.
- Solvent waste and oily rags must be kept in a fire-resistant, covered container until removed from the site.
- Flammable/combustible liquids must be kept in approved containers, and must be stored in an approved storage cabinet.

A.4.3.7 Electrical

- All temporary wiring, including extension cords, must have ground fault circuit interrupters (GFCIs) installed.
- Extension cords must be:
 - Equipped with third-wire grounding
 - Covered, elevated, or protected from damage when passing through work areas
 - Protected from pinching if routed through doorways
- Electrical power tools and equipment must be effectively grounded or double-insulated, UL-approved.
- Electrical power tools, equipment, and cords must be inspected for damage before use. If damaged, they shall be tagged and removed from service.

- Electrically powered equipment must be operated and maintained according to manufacturer's instructions.
- All electrical equipment, tools, switches, and outlets must be protected from elements.
- Only qualified personnel are to work on energized electrical circuits and equipment.
- Only authorized personnel are permitted to enter high-voltage areas.
- Switches, fuses, and breakers must be properly labeled.
- All 120-volt, single-phase 15 and 20 ampere receptacle outlets on construction sites, which are not part of the permanent building wiring, must be equipped with GFCIs for personnel protection.
- All portable electric generator receptacles must be effectively grounded by bonding the receptacle grounding wire to the generator frame.

A.4.3.8 Ladders

- Ladders must be inspected by a competent person for visible defects prior to each day's use. Defective ladders must be tagged and removed from service.
- Portable ladders must extend at least 3 ft above landing surface.
- The ladder must be faced when climbing with belt buckle between side rails.
- Both hands must be used to climb; ropes should be used to raise and lower equipment and materials.
- Straight and extension ladders must be tied off to prevent displacement.
- Ladders that may be displaced by work activities or traffic must be secured or barricaded.
- Fixed ladders greater than 20 ft in height must be provided with fall-protection devices.
- Stepladders must be used in the fully opened and locked position.
- The top two steps of a stepladder should not be used to sit or stand.
- Straight and extension ladders must be positioned at such an angle that the ladder base to the wall is one-fourth of the working length of the ladder.

A.4.3.9 Heat Stress

A.4.3.10 Preventing and Treating Heat Stress

- Drink 16 ounces of water before beginning work. Disposable cups and water maintained at 50°F to 60°F should be available. Under severe conditions, drink 1 to 2 cups every 20 minutes, for a total of 1 to 2 gallons per day. Take regular breaks in a cool, shaded area. Do not use alcohol in place of water or other nonalcoholic fluids. Decrease your intake of coffee and caffeinated soft drinks during working hours.
- Acclimate by slowly increasing workloads (e.g., do not begin with extremely demanding activities).

- Use cooling devices, such as cooling vests, to aid natural body ventilation. The devices add weight, so their use should be balanced against efficiency.
- Use mobile showers or hose-down facilities to reduce body temperature and cool protective clothing.
- Conduct field activities in the early morning or evening and rotate shifts of workers, if possible.
- Provide adequate shelter or shade to protect personnel against radiant heat (sun, flames, hot metal).
- Maintain good hygiene standards by frequently changing clothing and showering.
- Monitor buddy for signs of heat stress. Persons who experience signs of heat rash or heat cramps should consult the UXOSO or SSC to avoid progression of heat-related illness.
- Cool down immediately if heat syncope (sudden fainting), heat exhaustion (hot, pale, clammy/moist skin), or heat stroke (red, hot, dry skin; loss of consciousness) is experienced and consume cool water or sports drink. Persons who experience heat syncope or heat exhaustion should also seek medical attention as soon as possible. Persons who experience heat stroke must get immediate medical attention.

A.4.3.10.1 Monitoring Heat Stress

These procedures should be considered when the ambient air temperature exceeds 70°F, the relative humidity is high (greater than 50 percent), or when workers exhibit symptoms of heat stress.

The heart rate (HR) should be measured by the radial pulse for 30 seconds, as early as possible in the resting period. The HR at the beginning of the rest period should not exceed 100 beats/minute, or 20 beats/minute above resting pulse. If the HR is higher, the next work period should be shortened by 33 percent, while the length of the rest period stays the same. If the pulse rate still exceeds 100 beats/minute at the beginning of the next rest period, the work cycle should be further shortened by 33 percent. The procedure is continued until the rate is maintained below 100 beats/minute, or 20 beats/minute above resting pulse.

A.4.3.11 Procedures for Locating Buried Utilities

Local Utility Mark-Out Service

Name: Caleb Romero, NAPR, Puerto Rico

Phone: (787) 865-4152, Ext. 423

- Where available, obtain utility diagrams for the facility.
- Review locations of sanitary and storm sewers, electrical conduits, water supply lines, natural gas lines, and fuel tanks and lines.
- Review proposed locations of intrusive work with facility personnel knowledgeable of locations of utilities. Check locations against information from utility mark-out service.
- Where necessary (e.g., uncertainty about utility locations), perform excavation or drilling of the upper depth interval manually.

- Monitor for signs of utilities during advancement of intrusive work (e.g., sudden change in advancement of auger or split spoon).
- When NAVFAC or another onsite party is responsible for determining the presence and locations of buried utilities, the UXOSO should confirm that arrangement.

A.4.3.12 Working Near Water

When working near water, and there is a risk of drowning, the following precautions should be taken:

- U.S. Coast Guard-approved personal flotation devices (PFDs), or life jackets, provided for each employee shall be worn.
- PFDs shall be inspected before and after each use. Defective equipment will not be used.
- Sampling and other equipment shall be used according to the manufacturer's instructions.
- A minimum of one life-saving skiff shall be provided for emergency rescue.
- A minimum of one ring buoy with 90 ft of 3/8-inch solid-braid polypropylene (or equal) rope shall be provided for emergency rescue.

A.4.3.13 Working on Water

- Safe means of boarding or leaving a boat or a platform must be provided to prevent slipping and falling.
- The boat/barge must be equipped with an adequate railing.
- Employees should be instructed on safe use.
- Work requiring the use of a boat must not take place at night or during inclement weather.
- The boat/barge must be operated according to U.S. Coast Guard regulations (speed, lightning, right-of-way, etc.).
- The engine must be shut off before refueling; do not smoke while refueling.

A.4.3.14 IDW Drum Sampling

Personnel are permitted to handle or sample drums containing only investigation derived waste (IDW); handling or sampling other drums requires a plan revision or amendment approved by the HSM. The following control measures will be taken when sampling drums containing IDW:

- Minimize transportation of drums.
- Sample only labeled drums or drums known to contain IDW.
- Use caution when sampling bulging or swollen drums. Relieve pressure slowly.
- If drums contain, or potentially contain, flammable materials, use non-sparking tools to open.

- Do not use picks, chisels, and firearms to open drums.
- Reseal bung holes or plugs whenever possible.
- Avoid mixing incompatible drum contents.
- Sample drums without leaning over the drum opening.
- Transfer the content of drums using a method that minimizes contact with material.
- PPE and air monitoring requirements specified in Sections A.6 and A.7 must address IDW drum sampling.
- Spill containment procedures specified in Section A.9 must be appropriate for the material to be handled.

A.4.3.15 Confined Space Entry

No confined space entry will be permitted. Confined space entry requires additional health and safety procedures, training, and a permit. If conditions change such that confined-space entry is necessary, the HSM must be contacted to develop the required entry permit.

When planned activities will not include confined-space entry, permit-required confined spaces accessible to personnel must be identified before the task begins. The SSC is to confirm that permit spaces are properly posted or that employees are informed of their locations and hazards.

A.4.3.16 Working Around Material Handling Equipment

- Never approach operating equipment from the rear. Always make positive contact with the operator, and confirm that the operator has stopped the motion of the equipment.
- Never approach the side of operating equipment; remain outside of the swing and turning radius.
- Maintain distance from pinch points of operating equipment.
- Because heavy equipment may not be equipped with properly functioning reverse signal alarms, never turn your back on any operating equipment.
- Never climb onto operating equipment or operate contractor/subcontractor equipment.
- Never ride contractor/subcontractor equipment unless it is designed to accommodate passengers, and is equipped with a firmly attached passenger seat.
- Never work or walk under a suspended load.
- Never use equipment as a personnel lift; do not ride excavator buckets or crane hooks.
- Always stay alert and maintain a safe distance from operating equipment, especially equipment on cross slopes and unstable terrain.

A.4.3.17 Biological Hazards and Controls

A.4.3.17.1 Snakes

No poisonous snakes are indigenous to Puerto Rico.

Snakes typically are found in underbrush and tall grassy areas. If you encounter a snake, stay calm and look around; there may be other snakes. Turn around and walk away on the same path you used to approach the area. If bitten by a snake, wash and immobilize the injured area, keeping it lower than the heart if possible. Seek medical attention immediately. DO NOT apply ice, cut the wound, or apply a tourniquet. Try to identify the type of snake: note color, size, patterns, and markings.

A.4.3.17.2 Poison Ivy and Poison Sumac

Poison ivy, poison oak, and poison sumac typically are found in brush or wooded areas. They are more commonly found in moist areas or along the edges of wooded areas. Become familiar with the identity of these plants. Wear protective clothing that covers exposed skin and clothes. Avoid contact with plants and the outside of protective clothing. If skin contacts a plant, wash the area with soap and water immediately. If the reaction is severe or worsens, seek medical attention.

A.4.3.17.3 Ticks

Ticks typically are in wooded areas, bushes, tall grass, and brush. Ticks are black, black and red, or brown, and can be up to one-quarter inch in length. Wear tightly woven light-colored clothing with long sleeves and pant legs tucked into boots; spray only outside of clothing with permethrin or permethrin and spray skin only with DEET. Check yourself frequently for ticks.

If bitten by a tick, grasp it at the point of attachment and carefully remove it. After removing the tick, wash your hands and disinfect and press the bite areas. Save the removed tick. Report the bite to human resources. Look for symptoms of Lyme disease or Rocky Mountain spotted fever (RMSF). Indicators of Lyme disease: a rash might appear that looks like a bullseye with a small welt in the center. Indicators of RMSF: a rash of red spots might appear under the skin 3 to 10 days after the tick bite. In both cases, chills, fever, headache, fatigue, stiff neck, and bone pain may develop. If symptoms appear, seek medical attention.

A.4.3.17.4 Bees and Other Stinging Insects

Bee and other stinging insects may be encountered almost anywhere and may present a serious hazard, particularly to people who are allergic. Watch for and avoid nests. Keep exposed skin to a minimum. Carry a kit if you have had allergic reactions in the past, and inform the UXOSO and/or buddy. If a stinger is present, remove it carefully with tweezers. Wash and disinfect the wound, cover it, and apply ice. Watch for allergic reaction; seek medical attention if a reaction develops.

A.4.3.17.5 Bloodborne Pathogens

Exposure to bloodborne pathogens may occur when rendering first aid or cardio-pulmonary resuscitation (CPR), or when coming into contact with landfill waste or waste streams containing potentially infectious material. Exposure controls and PPE are. Hepatitis B vaccination must be offered where exposure is a possibility.

A.4.3.17.6 Other Anticipated Biological Hazards

The following paragraphs identify the potential hazards associated with flora and fauna at the site. If additional concerns are identified, they will be added to this Site Safety Health Plan.

Hazardous Flora. Incidence of contact by individuals to poisonous and thorny plants is high, especially during surface water and sediment sampling activities; therefore, bare skin should be covered (i.e., long pants and shirt, steel-toed boots, leather or cotton gloves, safety glasses, and head protection) as much as practical when working in forested or densely vegetated areas. Personnel should avoid entering an area in the direct path of known poisonous flora; a secondary route should be selected. Care should also be taken when walking in such areas because uneven terrain or vines may present a tripping hazard.

While attempting to cut into dense underbrush, hazards exist from the sharp machete and gas-powered weed cutter. Therefore, care should be taken when using such devices. (Note: Hearing protection, steel-toed boots, gloves, and safety glasses are required when using weed cutters.) All rashes and other injuries will be reported to the UXOSO as soon as they are known.

Hazardous Fauna. Mosquitoes and sand flies pose a nuisance and physical hazard to field personnel; they distract workers, leading to accidents, and pose a physical threat by transmitting live microorganisms. Sand fly bites that are repeatedly scratched can cause secondary infections. Avoid the use of perfumes and scented deodorants, and don light-colored clothing. The use of Avon's "Skin So Soft" or other insect repellent is encouraged.

The potential exists to come in contact with other dangerous insects; these include centipedes, fire ants, bees, wasps, hornets, mites, fleas, and spiders. All personnel should perform "checks" on each other periodically and at the end of the work shift, especially when working in grassy or forested areas. All insect bites must be reported to the UXOSO.

No poisonous snakes are indigenous to Puerto Rico, only non-poisonous snakes such as the Boa Constrictor. Feral (wild) dogs and cats have been observed.

Mongoose, rats, and mice have been documented to (potentially) carry rabies. There is some evidence that mongooses can be infected with the rabies virus in an attenuated form, allowing them to carry and spread the virus for a considerable time before succumbing to the disease. Any observed unusual behavior by mongooses and other mammals must be reported. Signs of rabies can be characterized in two forms. Animals with furious rabies exhibit agitation and viciousness, followed by paralysis and death. Animals with dumb rabies exhibit lethargy and paralytic symptoms, followed by death. Behavioral indicators for both include fearlessness and change in nocturnal/diurnal rhythms.

Working in wet or swampy areas unprotected shall not be allowed because of the presence of a variety of etiologic (disease-causing agents). Contact with surface water will be kept to a minimum. There have been several incidents of infection by schistosomes (blood flukes) from contact with surface water. The aquatic snail vector, *Australorbis glabratus*, transmits the schistosomes into surface waters, predominantly drainage ditches. Even momentary contact (especially in the presence of blisters, cuts, and open sores) with contaminated surface water is sufficient to acquire an infection. Accidental skin contact requires that the area be washed with isopropyl alcohol. Symptoms of infection are fever, diarrhea, itchy skin, and central nervous system (CNS) damage. Schistosomiasis is hard to treat; once established in its host, it may remain for several years.

Before beginning site activities, each individual shall be questioned as to any known sensitivities to the previously mentioned organisms or agents.

Dengue Fever and Other Illnesses. According to the Centers for Disease Control (CDC), Dengue Fever is primarily a viral infection transmitted by mosquito bites in residential areas. The mosquitoes are most active during the day, especially around dawn and dusk, and are frequently found in and around human habitations. The illness is flu-like and characterized by sudden onset, high fever, severe headaches, joint and muscle pain, and rash. The rash appears 3 to 4 days after the onset of fever. Because there is no vaccine or specific treatment, prevention is important. To reduce mosquito bites, travelers should wear clothes that cover most of the body. Travelers should also take insect repellent with them to use on any exposed areas of skin. The most effective repellent is DEET (N,N-diethyl meta-toluamide). Avoid applying high-concentration DEET (greater than 35 percent) products to the skin and refrain from applying repellent to portions of the hands that are likely to come in contact with the eyes and mouth. Rarely, toxic reactions or other problems have developed after contact with DEET. Please note that personnel performing water sampling should refrain from using DEET because the breakdown products can show up as false positive results in lab analysis. For greater protection, clothing can be soaked in or sprayed with permethrin, which is an insect repellent licensed for use on clothing. If applied according to directions, permethrin will repel insects from clothing for several weeks.

Traveler's Diarrhea is the most frequent health problem for travelers. It can be caused by viruses, bacteria, or parasites that are found universally throughout the region. Transmission is most often through contaminated food or water. Purchase food and beverages from vendors that are professional. Avoid small roadside stands and drink bottled beverages when possible. The use of over-the-counter or prescriptions medications can reduce the length of the attack.

Hepatitis A is a viral infection of the liver transmitted by the fecal oral route; through direct person to person contact; from contaminated water, ice, or shellfish; or from fruits or uncooked vegetables contaminated through handling. Symptoms include fatigue, fever, loss of appetite, nausea, dark urine, jaundice, vomiting, aches and pains, and light stools. No specific therapy supportive care is available, only supportive care. The virus is inactivated by boiling or cooking to 85°C for 1 minute. Therefore, eating thoroughly cooked foods and drinking only treated water serve as general precautions. CDC recommends hepatitis A vaccine as a precaution.

Fire Ant Bites. Fire ants typically build mounds on the land surface that are usually easy to identify. Avoid disturbing these mounds. A bite from a fire ant can be painful but rarely is life threatening. It is possible, however, that the bite could cause an allergic reaction. If bitten, check for symptoms of an allergic reaction such as weakness, nausea, vomiting, dizziness, or shortness of breath. If symptoms appear, seek medical attention.

A.4.3.18 Radiological Hazards and Controls

The Navy acknowledged inadvertently firing 263 rounds of depleted uranium (DU) ammunition in 1999. An intensive range sweep was initiated at that time and many of the DU rounds were recovered. The 25mm PGU-20 projectiles contain a small DU core about the size of a .50 caliber bullet. DU oxidizes rapidly when exposed to air. Oxidized DU is a greenish-yellow, powdery substance.

If a suspected DU projectile is encountered during MEC operations work will stop. UXO personnel will scan the suspected item with a radiation detection instrument. If the item is benign work will continue. If the item is radioactive the FS will refer to the contractors Health and Safety Program, Program and Training Manual, and Health and Safety Program Radiation Protection Manual for SOPs in contaminated areas.

If DU is suspected notify the SUXOS and UXOSO immediately, and contact the EOD Technical Support Center (TSC) at NAVEODTECHDIV for support 301-744-4069 or 1-877-363-4636.

The following equipment and personal protective equipment (as per U.S. Army, Industrial Operations Command, Pamphlet 700-48) will be available on-site in the case that UXO personnel are directed to remove and secure the DU to maintain the work schedule: coveralls, leather gloves, nitrile gloves, protective goggles, eye wash, hand cleanser, plastic bags (4 mil), metal container (30 gal, 55 gal, or ammunition box, swabs, tape to seal bags, marking pens, labels, and Radiac meter AN VDR2 6665-01-222-1425 (or similar). Direct surface or swab measurements with the Radiac meter can be performed if directed by support center.

A.4.3.19 Chemical Warfare Materials

CWM is not expected at these work sites. If, at any time during the fieldwork, suspected CWM is encountered, the UXO team must stop all work activities immediately. Field sampling teams must withdraw from the site along the cleared approach paths, away from the area where the suspected CWM is found. The UXO team will immediately report the chemical event to the FS, who will in turn notify the NAVFAC RPM.

The NAVFAC RPM in coordination with the DoI will request assistance through the US Army's 52d Ordnance Group at Fort Gillem, GA (404) 469-3333.

A team of at least two UXO-qualified personnel will secure the suspected CWM site and standby in an upwind location until relieved by a government representative. The initial exclusion zone for chemical weapons is 450 meters in all directions per US Army FM 9-15, Explosive Ordnance Disposal Service and Unit Operations.

A.4.3.20 Contaminants of Concern

VNTR: Previous investigations included the collection of soil and groundwater samples for VOCs, SVOCs, PCBs, and metals analysis. Parameters exceeding conservative long-term exposure risk based screening criteria in surface soils included aluminum, arsenic, iron, lead, thallium, vanadium, 2,4-dinitrotoluene, 2,4,6-trinitrotoluene, and hexahydro-1,3,5-trinitro-1,3,5,7-tetrazocine. In subsurface soils, the metals arsenic and barium exceeded screening criteria. Parameters exceeding screening criteria in groundwater included aluminum, barium, cadmium, chromium, iron, manganese, nickel, selenium, vanadium, and zinc. In addition, various small MEC and spent munitions were discovered at the site. The metals detected at the site were detected at concentrations indicative of background concentrations for the island. Table A-3 shows potential exposure routes.

TABLE A-3**Potential Routes of Exposure**

Dermal: Contact with contaminated media. This route of exposure is minimized through proper use of PPE, as specified in Section A.6.	Inhalation: Vapors and contaminated particulates. This route of exposure is minimized through proper respiratory protection and monitoring, as specified in Sections A.6 and A.7, respectively.	Other: Inadvertent ingestion of contaminated media. This route should not present a concern if good hygiene practices are followed (e.g., wash hands and face before drinking or smoking).
---	--	---

A.5 Project Organization and Personnel

A.5.1 Medical Surveillance and Training

Site personnel must meet State and Federal hazardous waste operations requirements for 40-hour initial training, 3-day on-the-job experience, and 8-hour annual refresher training. Employees designated SSC have completed a 12-hour site safety coordinator course, and have documented requisite field experience. An SSC with a level designation (D, C, B) equal to or greater than the level of protection being used must be present during all tasks performed in exclusion or decontamination zones. Employees designated "FA-CPR" are currently certified by the American Red Cross, or equivalent, in first aid and CPR. At least one FA-CPR designated employee must be present during all tasks performed in exclusion or decontamination zones. Certain tasks (e.g., confined-space entry) and contaminants (e.g., lead) may require additional training and medical monitoring.

Note: Lead awareness training is provided in Attachment A-3 of this plan. The quiz must be completed successfully by project personnel exposed to lead during MEC operations.

Pregnant employees are to be informed of and are to follow the procedures in the contractor's SOP, Reproduction Protection, including obtaining a physician's statement of the employee's ability to perform hazardous activities before being assigned field work.

A.5.2 Field Team Chain of Command and Communication Procedures

A.5.2.1.1.1 Client

Contact Name: Chris Penny, RPM, NAVFAC/Carlton Finley, ROICC, NAPR

Phone: (757) 322-4815/(787) 509-3071

Facility Contact Name: Oscar Diaz, Manager, Vieques National Wildlife Refuge (DoI)

Phone: (787) 741-2138

A.5.2.1.1.2 Title II Services Contractor

Project Manager: George Overby/Stacin Martin

Health and Safety Manager: Michael Goldman

Field Team Leader and SSC: Mark Kelly/Phil Balvocius

UXOSO: Mark Kelly/Phil Balvocius

A.5.2.1.1.3 Removal Action Contractor

Project Manager:

UXOSO:

Phone:

All site personnel (contractors and subcontractors) listed above are covered by this plan and must be provided a copy of it. This plan does not, however, address hazards associated with the tasks and equipment in which the subcontractor has expertise (e.g., MEC clearance). Contractors and subcontractors are responsible for the health and safety procedures specific to their work, and are required to submit these procedures to the Title II Services Contractor for review before the start of field work. Subcontractors must comply with the established Health and Safety Plan(s). The Title II Services Contractor UXOSO or SSC should verify that subcontractor employee training, medical clearance, and fit test records are current and must monitor and enforce compliance with the established plan(s). The Title II Services Contractor's oversight does not relieve subcontractors of their responsibility for effective implementation and compliance with the established plan(s).

The Title II Services Contractor should continuously endeavor to observe subcontractors' safety performance. This endeavor should be reasonable, and should include observing for hazards or unsafe practices that are both readily observable and occur in common work areas. The Title II Services Contractor is not responsible for exhaustive observation for hazards and unsafe practices. In addition to this level of observation, the SSC is responsible for confirming contractor and subcontractor performance against both contractor and subcontractor's Site-Specific Health Plan.

Health and safety related communications with site personnel should be conducted as follows:

- Brief personnel on the provisions of this plan, and require them to sign the Employee Signoff Sheet included in Attachment A-1.
- Ask personnel to brief the project team on the hazards and precautions related to their work.
- When apparent non-compliance/unsafe conditions or practices are observed, notify the contractor/subcontractor safety representative and require corrective action; the contractor/subcontractor is responsible for determining and implementing necessary controls and corrective actions.
- When repeat non-compliance/unsafe conditions are observed, notify the contractor/subcontractor safety representative and stop affected work until adequate corrective measures are implemented.
- When an apparent imminent danger exists, immediately remove all affected site personnel, notify the subcontractor safety representative, and stop affected work until adequate corrective measures are implemented. Notify the Project Manager and HSM as appropriate.
- Document all oral health and safety related communications in the project field logbook, daily reports, or other records.

A.5.2.1.1.4 Contractors

The Title II Services Contractor is not responsible for the health and safety or means and methods of Contractors who contracted directly to NAVFAC, and must never assume such responsibility through actions (e.g., advising on safety and health issues). In addition to this plan, the Title II Services Contractor staff should review contractor safety plans so staff

remain aware of appropriate precautions that apply to the Title II Services Contractor. Except in unusual situations when conducted by the HSM, the Title II Services Contractor must never comment on or approve contractor safety procedures.

Safety and health-related communications with contractors should be conducted as follows:

- Ask the contractor to brief the Title II Services Contractor employees and subcontractors on the precautions related to the contractor's work.
- When an apparent contractor non-compliance/unsafe condition or practice poses a risk to the Title II Services Contractor employees or subcontractors:
 - Notify the contractor safety representative.
 - Request that the contractor determine and implement corrective actions.
 - If needed, stop affected work until contractor corrects the condition or practice. Notify NAVFAC, Project Manager, and HSM as appropriate.
- If apparent contractor non-compliance/unsafe conditions or practices are observed, inform the contractor safety representative. The Title II Services Contractor's obligation is limited strictly to informing the contractor of our observation; the contractor is solely responsible for determining and implementing necessary controls and corrective actions.
- If an apparent imminent danger is observed, immediately warn the contractor employee(s) in danger and notify the contractor safety representative. The Title II Services Contractor's obligation is limited strictly to immediately warning the affected individual(s) and informing the contractor of our observation; the contractor is solely responsible for determining and implementing necessary controls and corrective actions.
- Document all oral health and safety related communications in the project field logbook, daily reports, or other records.

A.6 Personal Protective Equipment (PPE)

Table A-5 details the protective equipment necessary for various site tasks.

TABLE A-5
Personal Protective Equipment

PPE SPECIFICATIONS ^a				
Task	Level	Body	Head	Respirator ^b
General site entry Surveying	D	Work clothes; leather work boots ^a ; work glove.	Hardhat ^c Safety glasses Ear protection ^d	None required
MEC surveys and removals				
Observation of material loading for offsite disposal Oversight of remediation and construction				
Tasks requiring MEC anomaly reacquisition	Modified D	Work clothes or cotton coveralls	Hardhat ^c Safety glasses	None required

TABLE A-5
Personal Protective Equipment

PPE SPECIFICATIONS ^a				
Task	Level	Body	Head	Respirator ^b
in contamination area		Boots: chemical-resistant boots ^g OR steel-toed, leather work boots with outer rubber boot covers Gloves: Inner surgical-style nitrile and outer chemical-resistant nitrile gloves.	Ear protection ^d	
Tasks requiring upgrade or downgrade for reasons presented below	C	Coveralls: Polycoated Tyvek® Boots: chemical-resistant boots ^g OR leather work boots ^g with outer rubber boot covers Gloves: Inner surgical-style nitrile and outer chemical-resistant nitrile gloves.	Hardhat ^c Splash shield ^c Ear protection ^d Spectacle inserts	APR, full face, MSA Ultratwin or equivalent; with GME-H cartridges or equivalent.
Reasons for Upgrading or Downgrading Level of Protection				
Upgrade ^f		Downgrade		
<ul style="list-style-type: none"> Request from individual performing tasks Change in work tasks that will increase contact or potential contact with hazardous materials Occurrence or likely occurrence of gas or vapor emission Known or suspected presence of dermal hazards Instrument action levels (Section A.7) exceeded 		<ul style="list-style-type: none"> New information indicating that situation is less hazardous than originally thought Change in site conditions that decreases the hazard Change in work task that will reduce contact with hazardous materials 		

^a Modifications are as indicated.

^b No facial hair that would interfere with respirator fit is permitted.

^c Hardhat and splash-shield areas are to be determined by the UXOSO. UXO technicians are required to wear hard hats except when investigating suspect MEC.

^d Ear protection should be worn when conversations cannot be held at distances of 3 ft or less without shouting.

^e Cartridge change-out schedule is at least every 8 hours (or one work day), except if relative humidity is >85 percent, or if organic vapor measurements are > midpoint of Level C range (refer to Section A.7)—then at least every 4 hours. If encountered conditions are different than those anticipated in this HSP, contact the HSM.

^f Performing a task that requires an upgrade to a higher level of protection (e.g., Level D to Level C) is permitted only when the PPE requirements have been approved by the HSM, and an UXOSO or SSC qualified at that level is present.

^g Steel-toed boots are not required during surface geophysical mapping.

A.7 Air Monitoring/Sampling

A.7.1 Air Monitoring Specifications

Table A-6 shows relevant air monitoring specifications.

TABLE A-6
Air Monitoring Specifications

Instrument	Tasks	Action Levels ^a	Frequency ^b	Calibration
------------	-------	----------------------------	------------------------	-------------

PID: Organic Vapor Monitor (OVM) with 10.6eV lamp or equivalent	MEC anomaly reacquisition in contaminated areas	0 – 1 parts per million (ppm) >1 – 5 ppm > 5 ppm	Level D Level C Stop Work	Initially and periodically during task	Daily
---	---	--	---------------------------------	--	-------

^a Action levels apply to sustained breathing-zone measurements (2 minute duration) above background.

^b The exact frequency of monitoring depends on field conditions and is to be determined by the UXOSO SSC; generally, every 5 to 15 minutes is acceptable; more frequently may be appropriate. Monitoring results should be recorded. Documentation should include instrument and calibration information, time, measurement results, personnel monitored, and place/location where measurement is taken (e.g., "Breathing Zone/MW-3", "at surface/SB-2", etc.).

A.7.2 Calibration Specifications

Table A-7 shows calibration specifications.

TABLE A-7
Calibration Specifications

PID: OVM, 10.6 or 11.8 eV bulb	100 ppm isobutylene	RF = 1.0	100 ppm	1.5 lpm reg T-tubing
PID: MiniRAE, 10.6 eV bulb	100 ppm isobutylene	CF = 100	100 ppm	1.5 lpm reg T-tubing

A.7.3 Air Sampling

Sampling, in addition to real-time monitoring, may be required by other OSHA regulations where there may be exposure to certain contaminants. Air sampling typically is required when site contaminants include lead, cadmium, arsenic, asbestos, and certain VOCs. Contact the HSM immediately if these contaminants are encountered.

Results must be sent immediately to the HSM. Regulations may require reporting to monitored personnel.

A.8 Decontamination

The UXOSO or SSC must establish and monitor the decontamination procedures and their effectiveness. Decontamination procedures found to be ineffective will be modified by the UXOSO or SSC. The UXOSO or SSC must ensure that procedures are established for disposing of materials generated on the site.

A.8.1 Decontamination Specifications

Table A-8 shows the general decontamination specifications.

TABLE A-8
Decontamination Specifications

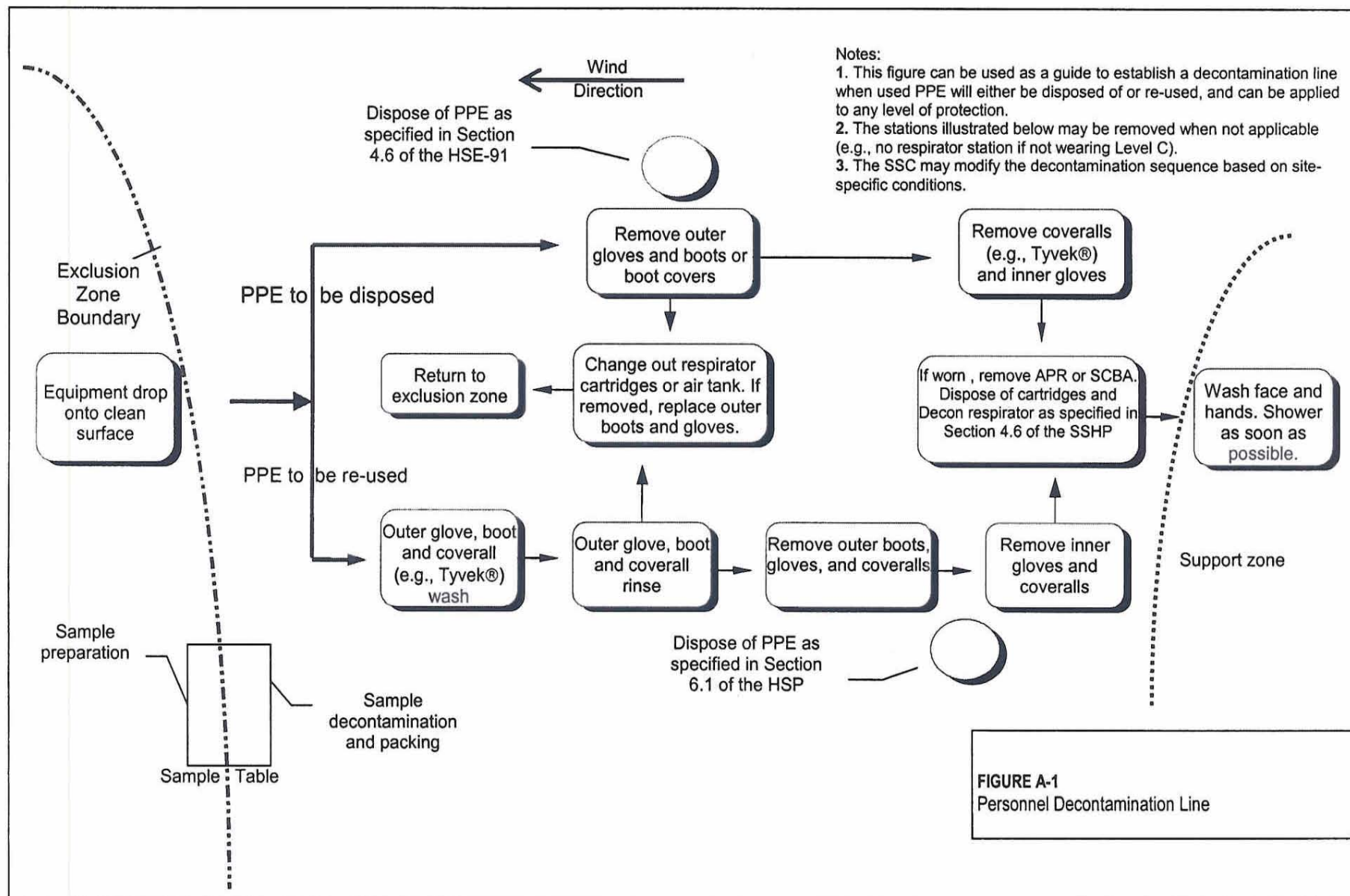
Personnel	Sample Equipment	Heavy Equipment
<ul style="list-style-type: none"> • Boot wash/rinse • Glove wash/rinse • Outer-glove removal 	<ul style="list-style-type: none"> • Wash/rinse equipment • Solvent-rinse equipment • Contain solvent waste for offsite disposal 	<ul style="list-style-type: none"> • Power wash • Steam clean • Dispose of equipment rinse water to facility or sanitary sewer, or

-
- | | |
|--|------------------------------|
| <ul style="list-style-type: none">• Body-suit removal• Inner-glove removal• Respirator removal• Hand wash/rinse• Face wash/rinse• Shower immediately• Dispose of PPE in municipal trash, or contain for disposal• Dispose of personnel rinse water to facility or sanitary sewer, or contain for offsite disposal | contain for offsite disposal |
|--|------------------------------|
-

A.8.2 Diagram of Personnel Decontamination Line

No eating, drinking, or smoking is permitted in contaminated areas and in exclusion or decontamination zones. The UXOSO or SSC should establish areas for eating, drinking, and smoking. Contact lenses are not permitted in exclusion or decontamination zones.

Figure A-1 illustrates a conceptual establishment of work zones, including the decontamination line. Work zones are to be modified by the UXOSO or SSC to accommodate task-specific requirements.



A.9 Spill Prevention and Containment Procedures

This section establishes minimum site requirements. Subcontractors are responsible for spill prevention and control related to their operations. Subcontractors' written spill prevention and control procedures must be consistent with this plan. All spills must be reported to the supervisor, site manager, and PM.

A.9.1 Spill Prevention

All fuel and chemical storage areas will be properly protected from onsite and offsite vehicle traffic. Fuel storage tanks must be equipped with secondary containment. Fuel tanks must be inspected daily for signs of leaks. Accumulated water must be inspected for signs of product before discharge.

Incidental chemical products must be properly stored, transferred, and used in a safe manner. If chemical product use occurs outside areas equipped with spill control materials, adequate spill control materials must be maintained.

A.9.2 Spill Containment and Control

Spill control materials will be maintained in the support zone and at fuel storage and dispensing locations. Incidental spills will be contained with sorbent and disposed of properly. Spilled materials must be immediately contained and controlled. Spill response procedures include taking the following actions:

- Immediately warn any nearby personnel and notify the work supervisor.
- Assess the spill area to ensure that it is safe to approach. Activate site evacuation signal if the spill presents an emergency.
- Ensure that any nearby ignition sources are immediately eliminated.
- If it can be done safely, stop the source of the spill.
- Establish site control for the spill area.
- Use proper PPE in responding to the spill.
- Contain and control spilled material through the use of sorbent booms, pads, or other materials.

A.9.3 Spill Clean-up and Removal

All spilled material, contaminated sorbent, and contaminated media will be cleaned up and removed as soon as possible. Contaminated spill material will be drummed, labeled, and properly stored until material is disposed of. Contaminated material will be disposed of according to applicable federal, state, and local requirements. Contact the regulatory compliance person for the project or the program for assistance.

A.10 Site Control Plan

A.10.1 Site Control Procedures

- The UXOSO or SSC will conduct a site safety briefing (see below) before starting field activities or as tasks and site conditions change.
- Topics for onsite safety briefing include a general discussion of this section, site-specific hazards, locations of work zones, PPE requirements, equipment, special procedures, and emergencies.
- The UXOSO or SSC records attendance at safety briefings in a logbook and documents the topics discussed.
- Post the OSHA job-site poster in a central and conspicuous location in accordance with contractor's SOP, OSHA Postings.
- Establish support, decontamination, and exclusion zones. Delineate with flags or cones as appropriate. Support zone should be upwind of the site. Use access control at entry and exit from each work zone.
- Establish onsite communication consisting of the following:
 - Line-of-sight and hand signals
 - Air horn
 - Two-way radio or cellular telephone if available
- Establish offsite communication.
- Establish and maintain the "buddy system."
- Initial air monitoring is conducted by the UXOSO or SSC in appropriate level of protection.
- The UXOSO or SCC is to conduct periodic inspections of work practices to determine the effectiveness of this plan: refer to Sections A.2 and A.3. Deficiencies are to be noted, reported to the HSM, and corrected.

A.10.2 Hazwoper Compliance Plan

Certain parts of the site work are covered by state or federal Hazwoper standards and therefore require training and medical monitoring. Anticipated Hazwoper tasks (Section A.2.1.1) might occur consecutively or concurrently with respect to non-Hazwoper tasks. This section outlines procedures to be followed when approved activities specified in Section A.2.1.2 do not require 24- or 40-hour training. Non-Hazwoper-trained personnel also must be trained in accordance with all other state and federal OSHA requirements.

- In many cases, air sampling, in addition to real-time monitoring, must confirm that there is no exposure to gases or vapors before non-Hazwoper-trained personnel are allowed onsite, or while non-Hazwoper-trained staff are working near Hazwoper activities. Other data (e.g., soil) also must document that no potential exists for exposure. The HSM must approve the interpretation of these data.

- When non-Hazwoper-trained personnel are at risk of exposure, the SSC must post the exclusion zone and inform non-Hazwoper-trained personnel of the following:
 - Nature of the existing contamination and its locations
 - Limitations of their access
 - Emergency action plan for the site
- Periodic air monitoring with direct-reading instruments conducted during regulated tasks also should be used to ensure that non-Hazwoper-trained personnel (e.g., in an adjacent area) are not exposed to airborne contaminants.
- When exposure is possible, non-Hazwoper-trained personnel must be removed from the site until it can be demonstrated that a potential for exposure to health and safety hazards no longer exists.
- Remediation treatment system start-ups: Once a treatment system begins to pump and treat contaminated media, the site is (for the purposes of applying the Hazwoper standard) considered a treatment, storage, and disposal facility (TSDF). Therefore, once the system begins operation, only Hazwoper-trained personnel (minimum of 24 hours of training) will be permitted to enter the site. All non-Hazwoper-trained personnel must not enter the TSDF area of the site.

A.11 Emergency Response Plan

A.11.1 Pre-Emergency Planning

The UXOSO or SSC will perform the applicable pre-emergency planning tasks before starting field activities and coordinates emergency response with all onsite parties, the facility, and local emergency service providers as appropriate. These tasks include:

- Review the facility emergency and contingency plans where applicable.
- Determine what onsite communication equipment is available (e.g., two-way radio, air horn).
- Determine what offsite communication equipment is needed (e.g., nearest telephone, cell phone).
- Confirm and post emergency telephone numbers, evacuation routes, assembly areas, and route to hospital; communicate the information to onsite personnel.
- Field Trailers: Post “Exit” signs above exit doors, and post “Fire Extinguisher” signs above locations of extinguishers. Keep areas near exits and extinguishers clear.
- Review changed site conditions, onsite operations, and personnel availability in relation to emergency response procedures.
- Where appropriate and acceptable to NAVFAC, inform emergency room and ambulance and emergency response teams of anticipated types of site emergencies.
- Designate one vehicle as the emergency vehicle; place hospital directions and map inside; keep keys in ignition during field activities.

- Inventory and check site emergency equipment, supplies, and potable water.
- Communicate emergency procedures for personnel injury, exposures, fires, explosions, and releases.
- Rehearse the emergency response plan before site activities begin, including driving route to hospital.
- Brief new workers on the emergency response plan.

The UXOSO or SSC will evaluate emergency response actions and initiate appropriate follow-up actions.

A.11.2 Emergency Equipment and Supplies

The UXOSO or SSC should mark the locations of emergency equipment on the site map and post the map, as illustrated in Table A-9.

TABLE A-9
Sample Supply List and Locations

Emergency Equipment and Supplies	Location
20 pound (lb) (or two 10-lb) fire extinguisher (A, B, and C classes)	Support Zone/Heavy Equipment
First aid kit	Support Zone/Field Vehicle
Eye Wash	Support & Decon Zone/Field Vehicle
Potable water	Support & Decon Zone/Field Vehicle
Bloodborne pathogen kit	Support Zone/Field Vehicle
Additional equipment (specify)	N/A

A.11.3 Incident Response

In fires, explosions, or chemical releases, actions to be taken include the following:

- Shut down operations and evacuate the immediate work area.
- Notify appropriate response personnel.
- Account for personnel at the designated assembly area(s).
- Assess the need for site evacuation, and evacuate the site as warranted.

Instead of implementing a work-area evacuation, note that small fires or spills posing minimal safety or health hazards may be controlled.

A.11.4 Emergency Medical Treatment

The procedures listed below may also be applied to non-emergency incidents. Injuries and illnesses (including overexposure to contaminants) must be reported to Human Resources. If there is doubt about whether medical treatment is necessary, or if the injured person is reluctant to accept medical treatment, contact the medical consultant. The UXOSO or SCC will assume charge during a medical emergency until the ambulance arrives or until the

injured person is admitted to the emergency room. During non-emergencies, follow these procedures, as appropriate:

- Notify appropriate emergency response authorities listed in Section A.11.8 (e.g., 911).
- Prevent further injury.
- Initiate first aid and CPR where feasible.
- Get medical attention immediately.
- Perform decontamination where feasible; lifesaving and first aid or medical treatment take priority.
- Make certain that the injured person is accompanied to the emergency room.
- Report incident as outlined in Section A.11.7.

A.11.5 Evacuation

- Evacuation routes and assembly areas (and alternative routes and assembly areas) are specified on the site map.
- Evacuation route(s) and assembly area(s) will be designated by the UXOSO or SSC before work begins.
- Personnel will assemble at the assembly area(s) upon hearing the emergency signal for evacuation.
- The UXOSO or SSC and a “buddy” will remain onsite after the site has been evacuated (if safe) to assist local responders and advise them of the nature and location of the incident.
- The UXOSO or SSC will account for all personnel in the onsite assembly area.
- A designated person will account for personnel at alternate assembly area(s).
- The UXOSO or SSC will write up the incident as soon as possible after it occurs and submit a report to the Director of Health and Safety.

A.11.6 Evacuation Signals

Table A-10 provides examples of possible evacuation signals.

TABLE A-10
Evacuation Signals

Signal	Meaning
Grasping throat with hand	Emergency-help me.
Thumbs up	OK; understood.
Grasping buddy's wrist	Leave area now.
Continuous sounding of horn	Emergency; leave site now.

A.11.7 Incident Notification and Reporting

- Upon any project incident (fire, spill, injury, near miss, death, etc.), immediately notify the PM and HSM. Call emergency beeper number if HSM is unavailable.
- Notify and submit reports to NAVFAC as required in contract.

A.11.8 Emergency Contacts (complete during project start-up)

Medical Emergency – 911 <i>911 Operators on Vieques DO speak English</i> Local Ambulance #: - 911 Hospital (Non-Emergency)#: (787) 741-2151	Contractor Medical Consultant See individual contractor SSHASP
Fire/Spill Emergency – 911 Local Fire Dept (Non-Emergency)#: (787) 741-2111	Local Occupational Physician
Security & Police – 911 FWS Law Enforcement # (24Hrs): (787) 946-6232 Local Police (Non-Emergency)#: (787) 741-2020	Corporate Director Health and Safety See individual contractor SSHASP
Utilities Emergency Water: Gas: Electric:	Health and Safety Manager (HSM) See individual contractor SSHASP
Title II Services Site Safety Coordinator (SSC) Name: Phil Balvocius/Mark Kelly Phone: (757) 671-8311 Ext. 446/411 Removal Action Contractor Site Safety Coordinator Name: Phone:	Regional Human Resources Department See individual contractor SSHASP
Title II Services Contractor Project Manager Name: George Overby/Stacin Martin Phone: (256) 539-6405/(757) 671-8311 Ext. 435	Corporate Human Resources Department See individual contractor SSHASP

Removal Action Contractor Project**Manager**

Name:

Phone:

Federal Express Dangerous Goods**Shipping**

Phone: (800) 238-5355

Worker's Compensation and Auto Claims

See individual contractor SSHASP Report fatalities and report vehicular accidents involving pedestrians, motorcycles, or more than two cars.

NAVFAC RPM: Chris Penny

Phone: (757) 322-4815

NAVFAC On-Site Support: Carlton Finley/ROICC NAPR

Phone: (787) 509-3071

Federal Agency/Contact Name: USFWS/Mr. Oscar Diaz

Phone: (787) 741-2138

Federal Agency/Contact Name: USEPA-CERCLA/Mr. Daniel

Phone: (787) 741-5201

Rodriguez

Federal Agency/Contact Name: USEPA-RCRA/Mr. Tim Gordon

Phone: (212) 637-4167

State Agency/Contact Name: PREQB/Ms. Yarissa Martinez

Phone: (787) 365-8573

Local Agency/Contact Name:

Phone:

Naval Ordnance Safety and Security Activity (NOSSA)

Phone: (301) 744-4450

NAVEODTECHDIV

Phone: (301) 744-4069 or
(877) 363-4636

Radiological Affairs Support Office (RASO)

Phone: (757) 887-7745

USACE Military Munitions Center of Excellence

Phone: (256) 895-1200

AEROMED Medical Evacuation

Phone: (787) 756-3480

Contact the Project Manager. Generally, the PM will contact relevant government agencies.

Facility Alarms: N/A

Evacuation Assembly Area(s):

Facility/Site Evacuation Route(s):

Hospital Name: Centro de Salud Familiar Susana Centeno

Hospital Phone #: (787) 741-2151

Address: Carr. 997 Kilometer 1 Ht. 0

Bo. Destino

Vieques Puerto Rico

Directions to Hospital

Exit the VNTR via the main road passing Camp Garcia on the right. At the intersection of Hwy 997 turn right. Head north on Hwy 997 for approximately 2 miles. The hospital is on the right.

If you reach the intersection of Hwy 997 and Hwy 200 you have driven too far north.

Important Notes on Medical Emergencies

1. Always call for an ambulance, but keep in mind access to the range is limited by gates and terrain. It may be necessary for the field team to transport the patient to the hospital, or possibly send someone to meet the ambulance and guide them to the site of the emergency.
2. The hospital is open 24hrs, however the ability to treat traumatic injuries is limited. Serious cases are flown to San Juan's Centro Medico Hospital via AEROMED helicopter. The entire AEROMED process (evaluation, notification, and transport) will take at least 1 hour. See attached map for Landing Zones (LZs). When contacting AEROMED identify appropriate LZ by appropriate designation and use road flare to mark pick-up point.

A.12 Attachments

Attachment A-1: Employee Signoff Form – Site Safety and Health Plan

Attachment A-2: Applicable Material Safety Data Sheets

Attachment A-3: Lead Awareness Training

ATTACHMENT A-1

EMPLOYEE SIGNOFF FORM

Site Safety and Health Plan

The contractor employees and subcontractors listed below have been provided with a copy of this FSI, have read and understood it, and agree to abide by its provisions.

Project Name:

Project Number:

[illegible]

ATTACHMENT A-2: APPLICABLE MATERIAL SAFETY DATA SHEETS

To be inserted at project start up.

ATTACHMENT A-3: LEAD AWARENESS

Lead Exposure Training Instructions

This module was designed for employees who work in areas with percent levels of inorganic lead or areas where there is a potential lead exposure above the action level of 30 $\mu\text{g}/\text{m}^3$.

Lead Exposure Training Program

The OSHA lead standard (29 CFR 1910.1025) requires employers to provide lead training for those employees who may be exposed to inorganic lead above the action level of 30 $\mu\text{g}/\text{m}^3$. This training program satisfies this OSHA requirement and is provided to assist employees in recognizing lead exposure hazards and understanding the procedures to be followed to minimize exposure.

Objectives

- Inform employees of the possible adverse health effects of lead exposure
- Inform employees of the regulatory requirements when working with or around lead
- Identify how lead exposures could occur on project

How to complete this training

Employees are required to read the training materials that follow and complete a short quiz. The training materials must be read thoroughly and understood before completing the quiz; you will have only one chance at answering each question.

Quiz scores will automatically be sent to the Health and Safety Training Administrator. A minimum score of 70 percent must be obtained to receive credit for this training. If a passing score is obtained, the H&S Training Administrator will issue you a certificate of completion. If a passing score is not obtained, you are required to contact your regional health and safety program manager to discuss the training material directly.

Lead Exposure Training

1. Uses And Occurrences

Lead is a well-known naturally-occurring metal found in the earth's crust, often associated with silver and zinc. It has had a variety of uses since antiquity, but its greatest use today is in car batteries. It was formerly used in gasoline, water pipes, pottery glazes, paint, solder, and as metal alloy. It currently has a variety of other uses such as radiation shielding, as vibration dampening material, in explosives, bullets, magnets, and in electronic equipment. It is also a common contaminant at hazardous waste sites.

2. Physical Characteristics

Lead exist as the familiar soft, dull gray metal, as a white or red solid as lead oxide, a gray or black solid as lead sulfide (galena), a white solid as lead sulfate, all which are insoluble in water. There are numerous other forms of inorganic lead. The organic forms, tetraethyl lead and tetramethyl lead, used in the past in fuels, are flammable colorless liquids also insoluble in water.

3. Toxicity and Hazards

Lead is a highly toxic substance that has a variety of adverse health effects from both chronic and acute exposure. An acute exposure to high levels of lead can cause a brain condition known as encephalopathy which can lead to death in a few days. The more common chronic exposure can also cause brain damage, blood disorders (anemia), kidney damage, damage to the reproductive system of both men and women and toxic effects to fetuses. Lead is stored in the bones and eliminated from the body very slowly. Consequently, exposures to low levels over many years can cause these adverse health effects. Lead is toxic by inhalation and ingestion, but is not absorbed through the skin. Some common symptoms of chronic overexposure include loss of appetite, metallic taste in mouth, anxiety, insomnia and muscle and joint pain or soreness.

4. Regulations

Inorganic lead has been specifically regulated in general industry by OSHA since 1981 (29 CFR 1910.1025) and in construction (29 CFR 1926.62) since 1994. The 8-hour permissible exposure limit is $50 \mu\text{g}/\text{m}^3$. There is no short-term exposure limit. OSHA also specifies an action level of $30 \mu\text{g}/\text{m}^3$. These limits apply to both general industry and construction. Initial air monitoring must be done whenever there are indications of lead exposure above the action level. If the action level is not exceeded, air monitoring can cease. If the action level is exceeded, initial blood lead level monitoring must be made available. If exposed above the action level for more than 30 days in a year, medical surveillance must be provided which includes further blood lead level monitoring and a medical examination. If specified blood levels are exceeded, the employee must be removed from the job or task where lead exposure occurs. Training must also be provided. If the PEL is exceeded, engineering controls must be implemented to reduce exposure. If engineering controls are not feasible or ineffective, respirators must be provided and worn. Air-purifying respirators with high-efficiency (HEPA) filters can be worn when airborne levels are as high as $500 \mu\text{g}/\text{m}^3$. If levels exceed this amount, supplied air respirators must be worn. In addition, if the PEL is

exceeded, OSHA requires the establishment of regulated areas, showers, change rooms, separate clean lunchrooms and warning signs. Regulated areas are demarcated from the rest of the workplace to limit access to authorized personnel who have received lead training. To enter a regulated area you must also wear protective clothing. Tetraethyl and tetramethyl lead each have separate PELs of 100 $\mu\text{g}/\text{m}^3$ and 150 $\mu\text{g}/\text{m}^3$ respectively, and are not covered under the inorganic lead regulation.

5. How Exposures Can Occur At Projects

Exposure to lead can occur at hazardous waste sites where lead is found in soil or groundwater and at old mining sites or former smelter sites. Exposure to lead-containing dust could occur during drilling, heavy equipment movement or other soil-disturbing activities. Dust formation can be minimized by wetting soils. Exposure could also occur during lead paint removal activities, during welding on metal surfaces with lead-containing paint, or in project work in smelters, battery recycling or manufacturing plants or at some mines.

6. Additional Information

Persons working at hazardous waste sites with known high amounts in soils (3 percent or 30,000 ppm) should have blood lead draws taken before and after site work. Air sampling should be done during soil disturbing activities at the site. Person working at non-hazardous waste site who have information or suspect they have been exposed to lead above the action level should contact a health and safety manager to determine if medical monitoring is needed or other regulatory requirements apply.

A.12.1 Lead Quiz

1. Which of the following is not a mode of entry of lead?
 - A. Inhalation
 - B. Ingestion
 - C. Skin absorption
 - D. All of the above are modes of entry

2. Which of the following is not a common symptom of lead exposure?
 - A. Loss of appetite
 - B. Metallic taste in mouth
 - C. Muscle and joint pain or soreness
 - D. All are common symptoms of lead exposure

3. What are the OSHA exposure limits for lead (PEL and action level)?
 - A. $50 \mu\text{g}/\text{m}^3$ and $25 \mu\text{g} / \text{m}^3$ respectively
 - B. 50 ppm and 25 ppm respectively
 - C. 50 ppm and 30 ppm respectively
 - D. $50 \mu\text{g}/\text{m}^3$ and $30 \mu\text{g} / \text{m}^3$ respectively

4. When is air monitoring required for lead exposures?
 - A. When exposed to lead for 30 days or more in a year
 - B. Anytime lead is present in the workplace

- C. When there are indications of lead exposure above the action level
 - D. When the PEL is exceeded
5. When must medical surveillance be made available for lead exposures?
- A. When the action level is exceeded
 - B. When the action level is exceeded for 30 days in a year
 - C. When the PEL is exceeded
 - D. When the PEL is exceeded for 30 days in a year
6. When is respiratory protection required for lead exposures?
- A. When the action level is exceeded
 - B. When the action level is exceeded for 30 days in a year
 - C. When engineering controls do not reduce exposure below the PEL
 - D. When the PEL is exceeded for 30 days in a year
7. What respiratory protection is considered acceptable for protection against lead exposures?
- A. Air-purifying with organic vapor cartridge
 - B. Air-purifying with HEPA cartridge
 - C. Air-purifying with lead cartridge
 - D. Supplied-air respirator is the only acceptable respiratory protection
8. What are the requirements for entering a lead-regulated area?

- A. Must be an authorized person
- B. Must complete lead training
- C. Must wear protective clothing
- D. All of the above

9. What control measure should be used to minimize dust formation when disturbing lead-containing soil?"

- A. Training
- B. Wetting the soil
- C. Air purifying respirators
- D. None of the above

10. What level of lead in the soil might require a lead blood test?

- A. 1% or 10,000 ppm
- B. 3% or 30,000 ppm
- C. 5% or 50,000 ppm
- D. None of the above